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A CLASSIFICATION OF MUTILATED DENTAL ARCHES REQUIRING TREATMENT BY REMOVABLE PARTIAL DENTURES

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ANY consideration of reparative dentistry must start with the ideal or standard of two unbroken dental arches of sixteen teeth each; the lower activated by the muscles of mastication attached to the mandible, the two together aided by the cheeks, the tongue and the lips performing the function of triturating food and mixing it with saliva to prepare it for deglutition; i.e., mastication.

While mastication of food is no doubt the most important function of the teeth and jaws, it must be noted that they fulfil other essential physiologic purposes as well. They aid in deglutition and they have an important part in the production of speech; and it is well understood that good appearance is largely dependent on the presence of a full set of teeth in such alinement as to maintain correct and pleasing relations of the lower third of the face to the head as a whole.

Read before the Section on Partial Denture Prosthesis at the Eighty-Third Annual Meeting of the American Dental Association, Houston, Texas, October 27, 1941.

For the maintenance of these functions at their highest efficiency, each member of the arch must (1) have unbroken contours and (2) be in lateral contact with its contiguous members. It will be noted that this fact conforms to the physical laws governing the use of the arch in various phases of architecture.

Some authorities term the completed dentition with its surrounding oral parts an organ, just as we refer to other organs in the body, because of the very important rôle the dental equipment has to play in the physiologic processes of the entire system.[1, 2] Whenever the arch becomes mutilated by losing some of its members, i.e. when teeth are extracted, the masticating function is impaired in proportion to the number of lost members as well as the position that they occupied in the arch.

The initial break in arch continuity is followed by a whole train of dental evils. It is common knowledge that the teeth on each side of the break, when deprived of their lateral contact, strongly tend to rotate, to tip into the space and to be-

come loosened. Destruction of the peridental membrane follows, with serious derangement of the occlusion. Unless a remedy is applied by means of repair or by reconstruction, the condition may rapidly progress to complete disintegration of the entire dental arch, finally necessitating the removal of all the teeth composing it.

It is true that third molars can be removed from the adult dental arch and the continuity of the remaining members be unaffected and function unimpaired, and also that the loss of a single tooth from the arch of a young person may often be compensated for by the moving of other teeth to close the gap, although this is questioned by some authorities. Almost all other cases of mutilation of the arch call for a more constructive remedy in the form of a so-called partial denture, either fixed or removable.

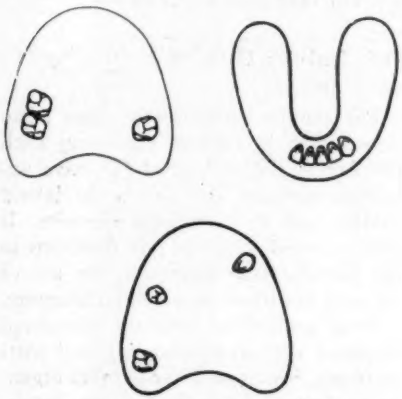

Fig. 1.—Types omitted from classification. Anchorage for retention being insufficient, partial dentures tend to convert the conditions rapidly into full denture cases.

The American Dental Association, it is appropriate to note here, has made a ruling in recent years that a section of the organization known as the Section on Partial Denture Prosthesis shall devote itself to the discussion of all forms of dental restorations of more than one tooth and less than the entire arch whether they be fixed or removable. Dental teachers and writers on this subject have agreed that it is almost impossible to establish a distinct line of demarcation in defining a partial denture and a removable bridge. In general, an appliance having saddles together with connecting bars and clasps is referred to as a partial denture or, more properly, a removable partial denture. Similar restorations having precision attachments fitting into crowns or inlays in the abutment teeth are popularly termed removable bridges. This discussion will deal exclusively with the partial removable denture or partial plate denture type. The fixed and removable bridge types,

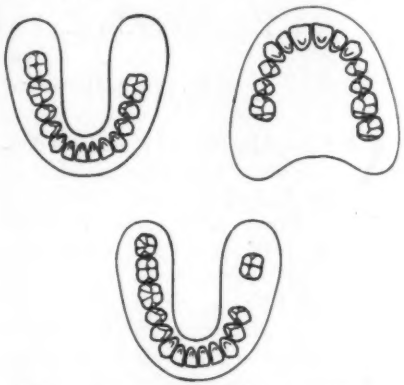

Fig. 2.—Types omitted from classification because infrequent. The usual means of treatment is more in the nature of a cantilever bridge than a partial denture of the type under discussion.

together with designs for the restorations themselves, will be omitted except for collateral reference.

In following accepted modern practice in medical and dental science, which demands a detailed diagnosis based on all the available facts which can serve as a guide in formulating the specifications of the remedy to be applied, it becomes necessary to have a classification of cases that will identify the outstanding types without recourse to a cumbersome tooth-by-tooth and space-by-space description, and, if possible, to include some of their

features. ("A plan of treatment should follow and be dictated by a diagnosis, and can by no stretch of the imagination take the place of it."[3])

For the purpose of classification, we need not consider the pathologic conditions that cause a break in the arch by the loss of teeth, because all pathosis has presumably been eliminated by the extraction which creates the space.

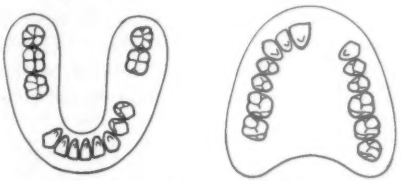

Fig. 3.—Type with short spaces not classified separately, although included in main groups. The restorative means takes the form of a bridge.

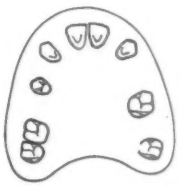

Fig. 4.—Cases, with relatively long spaces compared to those of Figure 3, classified as requiring partial dentures, which afford support and lateral bracing effect not obtainable by means of bridges.

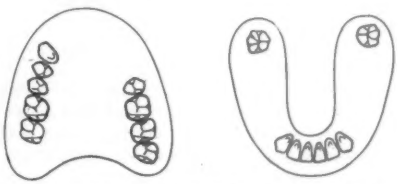

Fig. 5.—Type included in classification because either partial denture or bridges may be means of treatment. (Compare description of Class 6.)

Obviously, then, in mutilated arches, the main factors to be classified are the physical conditions. These consist of (1) the number, length and position of the spaces, which offer the most apparent evidence of impaired function of the dental organs, and (2) the number and position of the remaining teeth. Actually, these are the conditions that limit the usefulness of any appliance fabricated for remedying the deficiency. It may be regarded as axiomatic that the masticating function which can be considered restorable is in direct proportion to the number of remaining teeth.

Immediately a classification is attempted along this line, i.e. the spaces existing in the arch, two formidable difficulties arise. One is the mathematical magnitude of possible combinations. Beginning with the loss of one tooth, and progressing to the complete destruction of one arch of sixteen members, this runs into many thousands as computed by Cummer, who says that "in either the upper or lower jaw, there can be 65,536 cases."[4] Except for statistical purposes, such a classification would be virtually useless. Its manifold complexities would prohibit any further consideration of its application in dental practice as a basis for grouping similar cases that occur frequently. The other difficulty, that of making a classification sufficiently limited to come within the range of usefulness, inevitably results in a compromise by omitting some combinations that are occasionally observed.

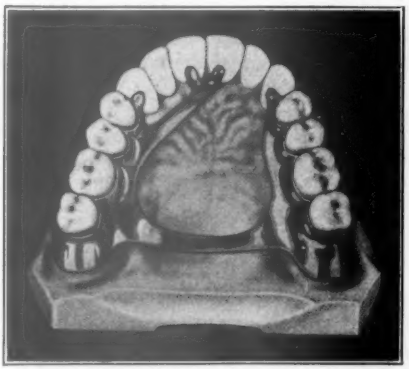

Fig. 6.—Partial denture as advertised, an example of mechanical design disregarding functional needs. It lacks effective support.

There is a well-established precedent for such a compromise, notably the Black

classification of tooth cavities, which does not include all cavities occurring on all tooth surfaces. It is highly significant that, in spite of these omissions, the Black cavity classification has come into almost universal use in the field of operative dentistry and has stood the test of usage over a long period of time. Moreover, some of the possible combinations of spaces and teeth remaining in the arch are such that a partial denture would be inefficient or would tend to cause early removal of the teeth that are in position. These cases should be regarded as temporarily deferred full denture cases, therefore it is not necessary to include them in a partial denture classification. (Fig. 1.) In the accompanying series of drawings, only typical instances have been selected for illustration among all the combinations that may occur in the class indicated. Wide latitude exists within each class for variations; that is to say, the classification is flexible.

Fig. 7.—Largest classification group, identified by bilateral spaces with no teeth posterior to them. A partial denture will be largely tissue borne. The restorable function is quite limited.

Fig. 8.—Posterior spaces, bilateral. Posterior tooth support is available on one side. The restorable function is greater than in Class 1.

A second group of combinations possible in either arch occur so infrequently as to be of quite minor importance and can be safely disregarded in a working classification, as in the instance of the Black cavity classification. (Fig. 2.)

A third group presents short spaces for which bridgework, either fixed or of the removable type, is unmistakably the best remedy. Therefore, it is not necessary to include this group as a separate class in a classification of cases wherein removable partial dentures are indicated. (Fig. 3.)

However, this group merges into those having much longer spaces. It is only necessary to regard the spaces in Figure 3 as being considerably increased by the further loss of teeth, whereupon the conditions that logically require partial dentures of a removable type readily become apparent. (Fig. 4.) Therefore all these groups are included in the major classes shown later.

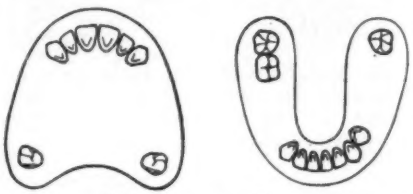

Fig. 9.—Bilateral spaces with posterior tooth support available on both sides. The restorable function is relatively greater than in other types, except Class 6, if spaces are of moderate length.

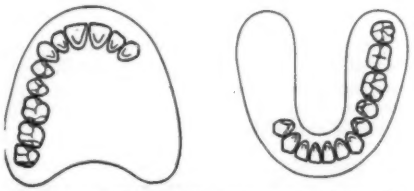

Fig. 10.—Unilateral space, very unfavorable for restoration of masticating function, although remaining teeth compensate unless interjaw relation is similar to that shown here. Secondary functions, i.e. aid in speech and appearance plus maintenance of vertical jaw relations, are almost wholly restorable.

A fourth group, having multiple short spaces, comprises cases wherein either bridgework or a removable partial denture can be used as the remedy of choice. Therefore, this group should be included

in the classification under discussion. (Fig. 5.) The choice depends on several facts. Frequently, it is determined by the condition of the abutment teeth. If their crowns are so badly decayed that they require restoration, suitably by bridgework, this would seem to be a decisive fact in favor of bridgework as the most desirable means of treatment, provided the peridental attachments are in good condition.

On the other hand, if the abutment teeth are not carious, other facts may prove to be conclusively in favor of treatment with a removable partial denture. The patient may justifiably object to the cutting of sound tooth surfaces, either from dread of the wear and tear on the nervous system or from a fear of losing the teeth due to some previous unfortunate experience with crowns.

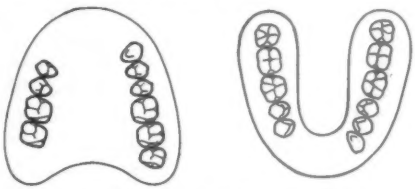

Fig. 11.—Single anterior space. The classification is unaffected by the absence of third molars. The case is favorable only for restoration of the secondary phases of function.

Under these conditions, the use of a partial denture would avoid the formidable cutting needed for bridge attachments. The resultant economy of both chair and laboratory time would permit a lower fee, which in itself is an important factor in many cases. Finally, another fact may determine the choice: If the peridental attachments of the abutment teeth are much impaired, a partial denture with its connecting bar will have the advantage of a bracing effect across or around the arch, acting as a splint, which would not be the case with bridgework in two or more separate pieces.

The cases that may be termed deferred full denture cases, the cases that occur infrequently and the cases requiring bridgework having been eliminated as outlined above, the remaining cases can now be grouped under a triad comprising all the features which it is essential to recognize in a classification of this kind, as follows:

1. Frequency of occurrence, which would indicate the numerical order of each class.

2. Position and extent of the space or spaces in the arch, which would indicate the type of appliance to be fabricated to remedy the mutilation.

3. The extent of support available in the form of remaining teeth at the ends of spaces, which would indicate the amount of function, especially masticating function, that it is possible to restore by means of the appliance used.

By making this approach to the problem, that is, an approach from the bio-

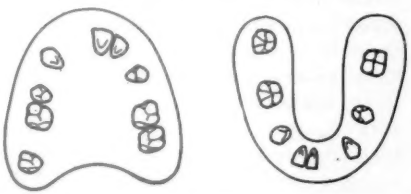

Fig. 12.—Irregular spaces around entire arch, favorable for restoration of function unless peridental attachments are badly impaired.

logic or physiologic standpoint of impaired function of an organ, the possibilities of the attempt to compensate for lost function by the use of an appliance, and also its definite limitations, will be better understood. Designs for the various types of cases will then develop with this consideration, functional efficiency, as the most important essential. If the approach is made from the engineering standpoint primarily, the resulting tendency in design is to stress mechanical details and thus to produce refined mechanisms that may fall far short of efficiency in function.

For instance, a removable partial denture is sometimes made to supply all of the upper teeth back of the cuspids, having very narrow saddles and with a light

skeleton frame across the vault and around the lingual aspect of the anterior teeth. (Fig. 6.) This is an example of mechanical refinement developed perhaps in response to the usual demand of the patient for lightness, for minimum bulk, leaving the vault open, and for a general appearance similar to that of fine jewelry. Such a restoration, though it may please the patient at first, lacks the essential feature for good function; that is, a broad bearing area on soft tissues, since there are no posterior teeth for support. Consequently, the denture fails to resist masticating stress sufficiently, settles rapidly out of occlusal contact and loosens the abutment teeth prematurely. A base with vault coverage, either in full or in part, would be much better adapted to meet the demands of mastication in this case.

The classification given later was evolved by applying the foregoing principles to a collection amounting to about 1,000 models accumulated in the prosthetic infirmary over a period of years with this object in view. Repeated preliminary sortings and groupings eliminated (1) the infrequent cases; (2) the cases in which partial dentures were impractical because too few teeth remained for adequate retention; (3) the cases in which removal of a considerable number of teeth, comprising all those remaining in the arch, was imminent because of peridental destruction, and (4) the cases in which bridgework was obviously the most desirable means of treatment because of the short spaces existing. This left about 600 models, more than one third of the original number having thus been set aside.

This remaining number was rearranged in six groups, which will be described. A critical and extended study was made of this arrangement to test its application to clinical practice and its capacity to include all cases in which partial dentures had been successful. This study finally led to the conclusion that this limited selection would represent nearly or quite all those cases in which partial denture construction would be feasible as they come into the hands of the general practitioner. In short, a workable classification of comparative simplicity for day-in and day-out needs had been gradually formulated in harmony with the three features enumerated. This was lacking in mathematical and statistical completeness, as might be expected, but it embodied an inherent facility for identifying and comparing the constantly recurring cases so that the resultant design could be evolved logically according to minor differences among cases in the same class.

This classification was tentatively adopted for classroom and clinical work about 1926, continuing to date.* It has proved a valuable aid in teaching and in keeping records. Later adopted by graduates for office practice, it is coming into more general use by the profession. All practical and statistical observations seem to indicate that it is sufficient for general needs. It is hoped that, like the Black cavity classification, because of its simplicity and its ability to describe the conditions that it classifies, it will withstand the test of time and extended usage.

The separate groups comprising the classification are as follows:

Class 1: Bilateral posterior spaces, remaining teeth in a segment in the anterior area.

$$\frac{4321|123}{321|1234}$$ (Fig. 7, A) (Fig. 7, B)

Class 2: Bilateral posterior spaces, one or more teeth at the posterior of one space.

$$\frac{87\ \ 4321|123}{54321|1234\ \ 78}$$ (Fig. 8, A) (Fig. 8, B)

Class 3: Bilateral posterior spaces, one or more teeth at the posterior of both spaces.

$$\frac{8\ \ 321|123\ \ 8}{87\ \ 321|1234\ \ 8}$$ (Fig. 9, A) (Fig. 9, B)

*University of California, School of Dentistry.

Class 4: A unilateral posterior space, with or without teeth at the posterior of the space, the arch unbroken at the opposite side.

87654321|123 (Fig. 10, A)
4321|12345678 (Fig. 10, B)

Class 5: Anterior space only, posterior part of the arch unbroken on either side.

7654 | 345678 (Fig. 11, A)
87654 | 345678 (Fig. 11, B)

Class 6: Irregular spaces around the arch, remaining teeth single or in small groups.

8 6 4 21| 3 5 7 (Fig. 12, A)
8 65 3 | 3 67 (Fig. 12, B)

THE FIRST CLASS (TABULATION)

The teeth in the anterior region usually number six to ten. They may be in equal or unequal arrangement on each side of the median line, with a strong tendency for this arrangement to be symmetrical.

Nearly all writers on this subject seem to note this type as occurring more frequently than any other, and to mention it first in efforts to classify their cases, but do not cite any statistical facts.[5]

This group, perhaps better than any of the others classified, permits the application of the triad of features enumerated, which stand out as demanding recognition in the plan of classification.

The First Feature.—Numerical frequency, about 45 per cent, is strikingly apparent in the tabulation given herewith, which logically therefore gives this type first place as a class in accordance with the triad.

The Second Feature.—The spaces, bilateral and posterior, indicate that the restoration will necessarily have to be one depending very largely on the soft tissues for support in mastication. This cannot be otherwise, since the remaining teeth can furnish only a limited part of the support necessary because of their anterior position out of the main area of mastication.

The Third Feature.—The amount of function restorable is closely related to the second feature. Owing to absence of posterior tooth-bearing, function can be restored to only a limited degree. The function of the natural teeth in the posterior areas is mainly mastication. They have but little to do with the function of speech, but they are the teeth that, more than any other part of the dentition, have the important secondary function of maintaining the vertical relations between the jaws. This type of partial denture cannot adequately meet the demands of masticating efficiency because the tissues which have to support it can bear only a fractional part of the available muscular force without severe pain and permanent injury. For similar reasons, the attempts that are made to restore and maintain vertical interjaw space with this kind of denture are subject to the same cause of failure, as it is found that the supporting tissues resorb too rapidly under these conditions to preserve the space for which the appliance is designed.

Thus, the condition may be summed up by saying that while this group comprises almost half of all partial denture cases, the partial denture used in its treatment is unfortunately the least efficient of all types in restoring function, although it may be very successful as regards comfort and satisfaction to the patient when the appliance is properly designed and executed.

THE SECOND CLASS

The second class occurs much less frequently than the first, although it does include a wide variation in the number of remaining teeth and their location in the arch. There is less tendency for an equal number of teeth to be left on each side of the median line; in fact, it is usual to find a short space on one side and a long space on the other.

The Type of Appliance Indicated.—The appliance indicated is one depending entirely, or nearly so, on tooth sup-

port on one side of the arch, the other side deriving its support to a great extent from the underlying mucous tissue especially in the upper arch.

The Function Restorable.—The possibilities of restoring function are much better than in the first class owing to the fact that more positive support is available at both ends of one space. It is found, as might be expected, that this side of the appliance is habitually used by the patient for chewing efficiently and comfortably rather than the opposite or long saddle side. In short, the nature of the appliance is partly that of a bridge and partly that of a plate denture.

THE THIRD CLASS

The number of anterior teeth remaining and their relation to the spaces is subject to much variation. Occasionally, there are double spaces on one side, and, in rare instances, on both sides; i.e., there may be a tooth standing between the remaining anterior teeth and the posterior group, and this condition may be bilateral. Numerically, this class is not very frequent. In distinction from Class 1 and Class 2, the prosthetic treatment for it is essentially bridgework, since there is tooth support available at both ends of all spaces. It must be evident that, in this class of case, there can be no clear line of demarcation between removable bridgework and so-called partial dentures.

The restoration may be either fixed bridgework, removable bridgework having precision attachments for retention and support or an appliance that is in effect a removable bridge, comprised of saddles, connecting bars and clasps. Having the characteristics of a partial plate denture, it frequently is referred to by the name partial plate. The choice will be made mainly according to the length of the spaces, bridges for the short ones, partial dentures for the long ones, the latter particularly if the crowns of the abutments are not carious.

Type of Appliance Indicated.—Under the conditions just cited, the restoration usually will take the form of narrow saddles connected by bars for transverse

A SURVEY OF PARTIAL DENTURE CASES*

Class	Teeth		Proportion Upper to Lower	Class Total	Approximate Per Cent
1	Upper	19	1	152	45
	Lower	135	7		
2	Upper	20	1	57	17
	Lower	37	2		
3	Upper	18	1	45	13
	Lower	27	1½		
4	Upper	15	1	37	11
	Lower	22	1½		
5	Upper	22	2	34	9
	Lower	12	1		
6	Upper	10	1½	17	5
	Lower	7	1		
	Total	342		342	100

*Frequency of occurrence in a classification proposed at the University of California for cases requiring treatment; based on a group of 620 study models from 130 patients for whom a total of 342 removable partial dentures had been made. (Original tabulation, January 1927, revised May 1941.)

bracing and with the necessary clasps for retention and also designed with suitable rests to receive support at all possible points on remaining teeth. The saddles serve principally to carry the necessary artificial teeth and to prevent food packing, but do not materially add to support in mastication.

Function Restorable.—This class, together with the sixth, presents better possibilities of restoring function than any of the others, since the appliance can be completely tooth borne.

THE FOURTH CLASS

In the extreme cases of the fourth class in the upper jaw, the space sometimes extends to one-half, or more, of

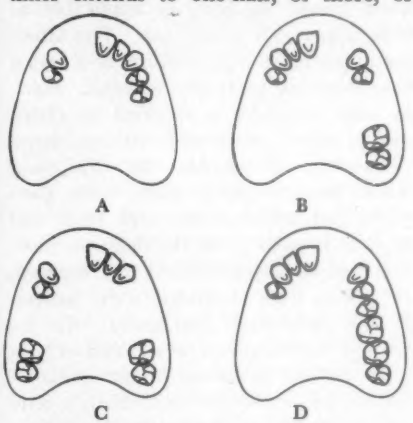

Fig. 13.—Combinations of: A, cl. 1 and 5; B, cl. 2 and 5; C, cl. 3 and 5; D, cl. 4 and 5. The problem of the restoration and its functional importance for the posterior spaces is of major importance in such cases.

the arch. In this class as in the third, the same difficulty is again apparent: to establish a definite physical limitation, which will indicate whether bridgework or a partial plate denture shall be used. A short space with a tooth posterior to it would facilitate the use of a bridge with both ends well supported, whereas the occurrence of a long space with no posterior teeth eliminates that possibility. In the first instance, functional restoration may be so nearly complete that the patient uses this area of the arch interchangeably with the opposite side, without any conscious difference. In the second instance, because it is possible to restore only a fraction of the original function, the patient is most likely to chew on the sound side opposite the restoration almost entirely for both efficiency and comfort. The restoration then fulfils a secondary though very important phase of function; namely, maintenance of the vertical location of the opposing teeth, which means maintenance of the vertical dimensions of the lower third of the face.

Since the attempt is here being made to classify cases requiring a partial denture of the saddle-bar-clasp type, rather than fixed or removable bridges, it is logical to specify "a long space" as the identifying feature of this class.

Type of Restoration.—The type of restoration indicated usually calls for a

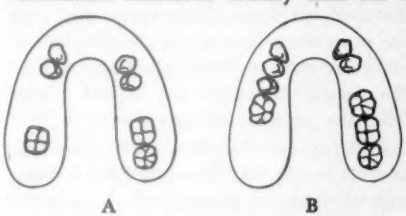

Fig. 14.—Combinations of: A, cl. 5 and 2; B, cl. 5 and 3. In these cases, functional and restoration problems for the anterior space are usually predominant.

bar for transverse bracing effect, a saddle designed for maximum bearing effect and the clasps necessary for retention.

Function Restorable.—As already cited, the function restorable can be only fractional, even with a posterior supporting tooth present.

THE FIFTH CLASS

This class of case may vary from the space of a single missing anterior tooth to an extreme condition where only the molars remain, as in Figure 1, A. The condition is the exact opposite of that in Class 1. With a short space present, the means of treatment, according to the best

prevailing practice, would usually be a fixed bridge, although, with a fixed bridge, it is often more difficult to secure an esthetic effect than with a partial removable denture. With the extremely long space, as in Figure 1, A, it is doubtful whether any type of partial denture would be of practical value and it could be considered only temporary at best.

The intermediate condition, wherein four, five or perhaps six teeth are missing, is the usual one. This class of mutilation is frequently the result of traffic and sports accidents, and cases are on record wherein all eight incisors were lost in this way.

Type of Restoration Indicated.—The restoration indicated is usually a saddle with two distal bars for a longitudinal bracing effect, together with anterior clasps or similar retaining devices designed with rests to receive support from the teeth adjacent to the space and with the posterior clasps or their equivalent so placed as to exert strong resistance against the tilting effect in the anterior area from the pressure of occlusion.

Function Restorable.—The condition present is not very favorable for restoration of the main function of the anterior teeth, incision of food masses. The appliance cannot be very effectively used for biting off masses of hard or tough foods because of the painful effect on the underlying tissues and the proximating tooth abutments if much force is used. Also, the repeated excessive movements of the abutment teeth would result in their premature loosening and early loss. The secondary functions of the anterior teeth, the part that they play in speech and as an aid to the appearance, can be and usually are almost completely restored by a removable partial denture appliance.

THE SIXTH CLASS (IRREGULAR SPACES AROUND THE ARCH)

This is a small group of cases wherein a number of short spaces are found with no regular arrangement in the arch. Remaining teeth are very likely to be single or in twos. There are so many variations that the cases present no distinct characteristic except irregularity. It may be considered a miscellaneous class because of the fact that it is comprised of a small number of cases that do not fit readily into the other classes.

Type of Restoration Indicated.—When this kind of case is not treated by means of a series of small fixed bridges, as is often done, or a removable bridge with precision attachments, two other means of treatment are resorted to, both coming in the category of partial plate dentures.

One, consisting of saddle and clasp units joined by bars, is applicable to both upper and lower cases. The other, for upper cases only, consists of a broad base covering most of the vault, which in some instances is retained by clasps and in other cases is used without clasps.

Function Restorable.—In this class, when the remaining teeth have good peridental attachments, and their full support is utilized for the denture, function can be almost completely restored, for a long term of service to the patient. If the peridental attachments are destroyed, function can be restored only in part and the treatment by an appliance cannot be considered other than a temporary expedient.

Combination class 1+5. (Fig. 13, A.)

43 |12345

Combination class 2+5. (Fig. 13, B.)

4321| 34 78

Combination class 3+5. (Fig. 13, C.)

87 43 |123 78

Combination class 4+5. (Fig. 13, D.)

4321| 345678

COMBINATION OR BLENDING OF CLASSES

In a small percentage of cases, the outstanding features of which group them in class 1, 2, 3 or 4, there may be an additional space in the anterior region (class 5). Such a space would require additional details in the design of the restoration for the case, but the essential character of the case is nevertheless that of the main group. The restoration problem is primarily that of class 1, 2, 3 or 4 plus a secondary combination element of class 5. Examples are shown in Figure 13.

Combination class 5+class 2.

876 43 | 3456

(Fig. 14, A.)

Combination class 5+class 3.

87 54 | 34 7

(Fig. 14, B.)

In the same way, a class 5 case may have an additional posterior space or spaces on one or both sides of the arch as described for class 1, 2, 3 and 4. Two examples are illustrated. (Fig. 14, A and 14, B.)

Instead of setting up a separate class or subclass of each of these and thus complicating the whole classification scheme to such an extent that it would tend to become unwieldy, it is more consistent with the purpose of the plan to consider these as blends or combinations of two classes and to develop restoration in accordance with the class the features of which are predominant.

Since the time when this tabulation was originally made, in 1927, it has been largely confirmed by extended clinical experience, reenforced by a further accumulation of models.

It is worthy of interest to note that even the cases that are referred to as infrequent and those termed deferred full denture cases also come within the limits of the classification, although some might be considered extreme examples.

I have given consideration to the idea that this classification, with some additional features defining and limiting the length of spaces, might be advantageously used for bridge cases as well as for removable partial denture cases.

From the standpoint of statistics, it may justly be said that in order to establish a more conclusive numerical sequence, a much larger number of cases should have been used. Selecting cases feasible for treatment by means of removable partial dentures from a limited number of models leaves small totals in some of the groups. Instead of about 1,000 models which were sorted to obtain the foregoing results, there should preferably be perhaps about 5,000 gathered from all kinds of dental practice, suburban and metropolitan.

The physical difficulties of securing such a large number of models can be readily understood, especially by those who have attempted any form of statistical effort in the dental profession. It would require a well-financed undertaking, to be closely followed up by competent clerical assistance.

However, the tendency to normal distribution should hold good so that the tabulation as it stands can safely be taken for practical purposes as a cross-section of the field of dentistry where treatment by means of removable partial dentures is indicated.

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THE ETIOLOGY AND CONTROL OF DENTAL CARIES

By Leonard S. Fosdick, Ph.D., Chicago, Ill.

THE incidence of dental caries has been increasing during the past few centuries,[1, 2] until today 98 per cent[3] of the population of this country suffer from the effects of the disease. This in itself is rather startling, but when one considers that the condition is so acute that 18.8 per cent of the rejections for military service are due to oral conditions, it is clear that the situation merits major consideration.

During the past few decades, there has been accumulating a vast amount of material which seems to indicate that the etiology of dental caries is now fairly well understood. Although there is still much disagreement on some of the minor points, there is little dissension among research workers concerning the fundamentals of the disease. The results of years of work by a great number of investigators show that there are many variables among the factors in caries. From these data, a rational theory concerning the mechanism of the disease can be formulated; and on the basis of the known facts concerning the mechanism, rational methods of control can be determined and utilized.

As far back as 1887, Miller[4] and Black[5] proposed that tooth decay was due to the formation of lactic acid in the mouth as a result of carbohydrate fermentation. These men furnished much evidence in support of their views, but there remained many facts that could not be explained on the basis of their experimental evidence.

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Although the theory of Miller and Black stands as the most rational one regarding tooth decay, present-day knowledge concerning the mechanism is so complex that one may have difficulty in recognizing caries as still in the realm of the original chemicobacterial theory. The investigations of Bunting and his co-workers[6] have established that *L. acidophilus* is the predominant organism associated with dental caries under the conditions of the experiment. Although this fact does not help to explain the mechanism of the disease, it has placed a very important tool in the hands of the dentist as a diagnostic procedure.

Marshall, in 1915,[7] showed that, in general, the titratable alkalinity of the saliva from individuals immune to dental caries is greater than in the saliva of individuals with active caries. This work was severely criticized by Gies,[8] but was later substantiated by Hubbel,[9] Karshan[10, 11] and Campaigne.[12]

Karshan[13] showed that the saliva from immune individuals was more highly supersaturated with calcium than saliva from individuals susceptible to dental caries. All other facts being equal, more acid would be necessary to dissolve the teeth in the presence of saliva when the degree of supersaturation with calcium was high.

Trimble and his co-workers[14] and Zaus[15] found the flow of saliva a major factor in establishing immunity to decay. These authors, working independently, found that, in general, the immune individuals had a much more rapid flow of saliva than did the individuals suffering from rampant caries. This fact suggests that the self-cleansing ability of the

mouth may be quite important in establishing immunity to caries.

Fosdick, Hansen and Epple[16] found that one of the major differences between the saliva of immune and of susceptible persons was the rate at which it promoted the formation of acid in the presence of enamel and free sugar. It was found that the rate of acid formation from sugar in saliva is extremely high in saliva from susceptible individuals; while, in the same mixture, with saliva from caries-immune individuals, the initial rate of acid formation is extremely slow. In the two cases, the same amount of acid is formed if the reaction is allowed to go to completion. It was on the basis of this marked difference that the chemical test for caries was formulated.

TABLE 1.—CASE DATA*

Date†	Chemical Susceptibility	Aciduric Bacteria Count
12/18/40	††††	24,000
12/30/40	†††	5,000
1/14/41	†	8,200

*Case 3103 (boy, aged 16); clinical susceptibility, ††; salivary flow 9 cc.
†Placed on sugar-free diet.

This will be explained in detail later on.

In 1936,[17] it was pointed out that the fermentation of carbohydrates by yeast and certain other aciduric organisms was similar to the process of carbohydrate degradation by muscle tissue, and that if the mechanism was a universal phenomenon, as it appeared to be, the process should be the same in the oral cavity. On this basis, an investigation was made into acid production by mixed mouth organisms in the presence of saliva. As a result of this investigation, nearly[18] all of the predicted intermediate compounds were isolated; which proved that fermentation in saliva with the formation of acids was no exception to this universal phenomenon. In addition to this, it was soon clear that no single mouth organism was associated with an enzyme system sufficient for the rapid production of acid.[19, 20, 21] For this reason, it would be impossible for any one organism, unassisted by enzymes from other organisms or from the surrounding media, to produce acids fast enough to be effective in decalcifying the teeth. This would indicate that two or more organisms working in conjunction were necessary for the production of caries. Furthermore, it suggests that enzymes from the saliva or from the tissue itself may play an important rôle in the production of acids.

In addition to the foregoing conditions, which have been extensively investigated, there are others that have been noted on careful clinical observation and which may play an important rôle in the disease. It has been noted that, in most immune cases, the teeth are perfectly formed with good contacts, fine occlusion and an absence of pits and fissures on the occlusal surfaces. In other words, the teeth are usually arranged in the mouth in such a manner that they are comparatively self-cleansing, and with relatively few areas where stagnation of saliva and impaction of food can occur. It has been noted that when foreign objects are placed in the mouth, so as to cause the formation of stagnant areas or to decrease the self-cleansing ability of the teeth, the caries activity increases, as has been observed with the use of certain orthodontic appliances.

TABLE 2.—CASE DATA*

Date	Chemical Susceptibility	Aciduric Bacteria Count
3/25/40	††	259,000
4/ 1/40	†††	336,000
4/ 8/40	†††	—
4/29/40†	†	8,000
6/17/40	–	14,000
8/ 7/40	†	88,000
12/ 6/40	No test	18,000

*Case 1374 (girl, aged 10); clinical susceptibility †††.

This indicates that, in these cases, the rate of acid formation would not have to be so rapid as in some other cases in order to decalcify the teeth, because, with the protection of the neutralizing and cleansing action of the saliva diminished, the acids that are formed are in contact with the teeth for a longer period of time.

During recent years, Stephan,[22] using the antimony electrode, has occasionally found in carious lesions pH values low enough to decalcify the teeth, but this was not the usual condition. This work was confirmed in our laboratory by means of the glass electrode. It was further found that the acid was formed with extreme rapidity when free sugar was placed in an open cavity or in a so-called

TABLE 3.—CASE DATA*

Date	Chemical Susceptibility	Aciduric Bacteria Count
9/30/40	†††	23,000
10/14/40	††††	175,000
11/ 5/40	††	127,000

*Case 2524 (girl, aged 20); salivary flow, 3 cc; clinical susceptibility †††.

susceptible area. It was found that when any simple sugar is placed in a cavity or in a susceptible area, the pH may drop to 4.0 in three minutes. Although this is faster than is usual, it demonstrates that acids can and do form very rapidly. Furthermore, it was found that the acids were neutralized either by the saliva or by the dissolving tooth structure in a comparatively short time.

According to theory, lactic acid should be the predominant acid formed by the reactions taking place in the mouth. Campaigne[12] found this to be true in fermentation products of saliva-glucose-enamel mixtures. On the basis of this work, a microtechnic[23] was adapted for the analysis of the lactic acid content of carious material and materia alba. Here again, it was found that lactic acid was formed rapidly in large quantities. Although the lactic acid is not the only acid formed, it was noted that there was more lactate than the drop in pH would account for, provided none of the lactic acid was neutralized by the buffer action of the saliva. The lactic acid formation was exceedingly rapid after the ingestion of free sugar. As the test determines total lactates, the discrepancy between the drop in pH and the total lactates would mean that considerable amounts of the lactic acid formed were immediately neutralized by the buffering action of the saliva and materia alba.

When one considers all of the foregoing phenomena as taking part in the process of dental caries, it becomes quite clear that we have a large number of variables to correlate and integrate into a logical sequence of events in the carious process. On the basis of the foregoing, it seems that we have two clear-cut processes opposing each other the result of which will determine whether the tooth will decay. In the first place, we have a great number of factors in a mechanism designed for neutralizing acids in the mouth. The acid neutralizing power or buffer capacity of the saliva is a very important factor. This neutralizing factor is variable, the exact buffering capacity depending on the diet as a major factor.[24] In most mouths, it is sufficient to neutralize large amounts of acid. This neutralizing action is so powerful that the pH of the mixed saliva is never sufficiently acid to decalcify the teeth no matter how active the carious process is. This would indicate that any saliva, provided it could reach all parts of the mouth in a never ending stream, would be adequate to prevent caries. Unfortunately, the saliva cannot reach every part of the mouth in a steady stream, for several reasons. In many cases, the teeth are so arranged that there are areas in which stagnation can occur, such as is found with certain types of contacts, pits and fissures and some malocclusion and

orthodontic appliances. In many mouths, where areas of stagnation are few, there is such a slow flow of saliva that many fairly accessible areas in the mouth become stagnant.

Nature has endeavored to compensate for lack of saliva in some cases by supersaturating the saliva with tooth minerals. This helps to a large degree in many cases, but even this is not enough if much stagnation is present. Thus, we find that nature has provided a very efficient system for neutralizing acids in the mouth. Unfortunately, not all individuals have the same degree of protection, and in many cases the degree of protection is inadequate to cope with the stream of acid resulting from fermentation in isolated stagnant areas of the mouth.

The damaging forces that Nature has been trying to overcome have become increasingly powerful as civilization has foisted a modern diet upon the people. These forces have to do with the rate of acid production in the mouth. As was stated above, in many mouths acids are formed with amazing speed. This rate of acid formation is governed by two primary factors. In the first place, it is necessary to have a substrate from which the acids can be formed. The rate of acid formation depends to a large extent on the type of substrate present. Any of the simple sugars and sucrose and maltose are very good substrates for rapid acid formation. In general, the more concentrated the substrate, the more rapid the action. It is possible that other carbohydrates will serve as substrates, but with them the rate of acid formation is slow as compared to that of the monosaccharides and disaccharides.

The other governing fact in relation to the rate of acid formation is the enzyme system present. If an optimum enzyme system is present, the acids are formed rapidly, but if any one of the necessary enzymes is absent or is present only in suboptimum quantities, the rate of reaction is that permitted by the deficient enzyme.

Presumably, most of the enzymes come from the bacteria of the oral cavity, but this is not necessarily the case. It is quite

TABLE 4.—RESULTS OF ORAL HYGIENE RÉGIME IN TWENTY CASES

Patient	Calcium Dissolved at Beginning	Calcium Dissolved on Test	Change in Susceptibility	Cavities	Time Months
1	15	10	− 5	0	6
2	20	− 2	−22	0	9
3	10	1	− 9	0	9
4	16	5	−11	0	9
5	9	0	− 9	0	6
6	19	10	− 9	2	6
7	16	5	−11	0	6
8	14	6	− 8	1	6
9	10	− 9	−19	1	6
10	16	1	−15	0	6
11	9	− 1	−10	0	7
12	6	4	− 2	0	6
13	5	2	− 3	0	9
14	13	5	− 8	7	9
15	13	3	−10	0	9
16	16	14	− 2	1	6
17	19	5	−14	0	6
18	10	3	− 7	0	6
19	10	4	− 6	2	12
20	12	1	−11	1	6

possible that some of the necessary enzymes or coenzymes are derived from the saliva or even from the oral tissue itself. At any rate, we know that for rapid acid formation, the enzyme system must be optimal.

With these facts in mind, it is now possible for us to formulate certain procedures for controlling caries. Obviously, there are three avenues of approach: We can increase the protective action of the oral cavity, we can eliminate the substrate or we can destroy the enzyme system. Any method must include the measuring of caries activity so as to determine the effect of any procedure tried, without waiting months or even years for evidence as to the results.

We are fortunate in having at least two good methods for this determination: the bacteriologic test as developed by Bunting and Jay and the chemical test as developed at Northwestern University.

THE BACTERIOLOGIC TEST

Bunting and Jay have shown that when active caries is present, *L. acidophilus* is also present, and when *L. acidophilus* is consistently absent, the process is inactive. The bacteriologic procedure is not particularly complicated and can be performed in any dental office with little equipment. However, the definite procedure outlined by the authors must be followed or results will be erroneous. The test, if performed according to the proper technic, will assure accurate correlation with clinical estimations in about 85 per cent of cases. Snyder has developed a modification of this test which may enhance its usefulness.[24]

THE CHEMICAL TEST FOR DENTAL CARIES

This test is based upon the rate of acid formation in glucose-saliva-powdered enamel mixtures. The saliva is gathered and mixed with the sugar and the enamel. It is then incubated for a period of four hours. At this time, the amount of acid formed is measured by determining the amount of calcium dissolved, dissolution of calcium being a function of acid formation. This test, according to theory, should be accurate as all of the constituents, such as buffering capacity, degree of supersaturation and acid neutralizing power, are present. However, in the hands of the author, it agrees about 85 per cent with clinical estimations. Its main advantage is that it estimates susceptibility in definite terms, $-$, $\pm$, $+$, $++$, $+++$, $++++$; which is not the case with the bacteriologic test. It has many disadvantages, however, as the saliva must be freshly gathered and an elaborate equipment is necessary. Its use will probably be confined to institutions for the present.

By the use of the foregoing tests, it is possible to follow the changes in caries activity effected by any procedure. It becomes unnecessary to place a patient under experimental treatment for long periods of time to determine the effect of treatment. In the last analysis, before any definite conclusions can be reached, it will be necessary to obtain clinical evidence in addition to the evidence afforded by the laboratory experiment.

On the basis of these theoretical considerations, there are several procedures by which we may alter or control caries activity. In the first place, it is possible that we can alter the susceptibility to caries in some cases by changing the neutralizing or immunizing agents in the mouth. Some of these, such as acid-neutralizing power or buffering capacity, the degree of supersaturation of calcium phosphate and the correction of poor occlusion or malformation of the teeth, can be altered. Operative or orthodontic treatment has gone far in eliminating areas of stagnation, but is often resorted to after the caries process is well advanced. Many experiments have been made in attempts to increase the calcium and phosphorus content of the saliva, but as yet all attempts have failed. The

acid-neutralizing power or buffering capacity of the saliva can readily be changed, and, in a number of cases, success has been reported in controlling caries by a diet producing an alkaline ash. Jones[25] reported considerable success along these lines on the natives of Hawaii. Boyd and Drain[26] reported similar success, and Willis and Forbes,[27] at the University of Virginia, reported that tremendous increase of the alkaline content and in the acid-neutralizing power of the saliva can be effected by an alkaline diet. So far as this method of developing immunity simply increases the neutralizing power of the saliva, it is necessary for the saliva to reach all areas of the mouth. It is true that with a higher acid-neutralizing power, less saliva will be needed for the control of caries, but the saliva must still be present in sufficient quantities to neutralize any acids that may be formed. On this basis, one would not expect all individuals to respond to this treatment, which explains why so many investigators have not had marked success with such methods of treatment.

There are two other methods by which control can be effected. One is to eliminate or destroy the enzyme system that is the cause of the acid formation. This can be done by several means. There are substances that are known to poison certain enzymes necessary in the formation of acid. One of these is the fluorine ion. This ion prevents the formation of phosphoric esters and is known to stop acid formation in the process of fermentation, stop the degradation of glycogen to lactic acid during muscular activity, inhibit bone formation or cause abnormal bone formation and abnormal tooth calcification. There are certain areas in this country and abroad where the drinking water contains sufficient fluorine ions to cause abnormal tooth formation, but an insufficient quantity to be harmful in muscle metabolism. It has been shown that, in these endemic areas, little dental caries has been found. While the concentration of the fluoride ion in these cases is insufficient to cause abnormal muscle metabolism, when it is considered that the teeth adsorb large quantities of the fluoride ion, it appears possible that the concentration in the teeth is sufficient to inhibit the local formation of lactic acid to such extent that the natural neutralizing or immunizing influences of the mouth will cause immunity to caries.

Another method of poisoning the enzyme system is by the use of iodo-acetic acid. It has been shown by Miller[28] that the caries sometimes observed in rats is inhibited by the use of this drug.

It should be remembered, in the use of any of these enzyme poisons, that toxic symptoms may arise that would be of far greater harm than the disease which we are attempting to cure. For this reason, any attempts to control caries by means of enzyme poisons should be attended with great caution.

Another method of controlling caries would be the elimination of the substrate, which, of course, means the elimination of free sugars. This method has been practiced widely by a number of investigators. Jay *et al.*[9] have shown that the elimination of free sugars will stop caries in about 90 per cent of cases. He further suggests that elimination of starches as well as free sugars for a short period of time is much more advantageous than the elimination of free sugar only. This work has been substantiated at Northwestern University and other institutions. Tables 1, 2 and 3 present some typical cases of this treatment.

The main disadvantage of this method is that the habit of consuming large quantities of sugar is so firmly established in this country that patient cooperation cannot be secured unless caries is so severe that a definite economic and health hazard is evident. Even in these cases, only partial cooperation is usually obtained. Nevertheless, if patient cooperation can be obtained, definite control

of caries can be established. So far as each individual can tolerate various quantities of carbohydrates and free sugar and still be relatively immune to caries, the proper procedure is to initiate diets based upon the various tests for susceptibility, and by analytic procedures determine the exact amount of carbohydrates tolerated. By this method, considerable patient cooperation can be obtained. In most cases, adequate diet with sufficient amounts of sugar and other carbohydrates can be used.

Another means which the theoretical considerations suggest for the elimination of substrate is the practice of oral hygiene. It has been shown that the acids formed in the production of dental caries are present only immediately or shortly after the ingestion of fermentable sugars, and that decalcification is complete in a relatively short time. These experiments immediately suggest that if oral hygiene procedures were practiced before the acids could be formed or before the acids had time to cause an appreciable amount of decalcification, dental caries could be reduced. It is true that, in a large number of cases, the acids are completely formed within a very few minutes after the ingestion of the carbohydrate, but, in the large majority of cases, the acids are not completely formed until fifteen or twenty minutes after ingestion of the sweet substance. Furthermore, there is considerable evidence that the concentration of the free sugar may be an important variable. In any event, if the sugars and acids are cleared from the mouth before appreciable action has time to set in, the caries process will stop immediately.

On this basis, fifty patients were selected, all of whom were very susceptible to caries. The degree of susceptibility was determined both by chemical analysis and by clinical observation. All patients had a full-mouth x-ray examination followed by a complete dental examination and each cavity and filling was charted. All cavities were filled, so that the mouth was free from caries. Each patient was then placed on the following oral hygiene régime: No attempt was made to alter or regulate the normal diet, which in some cases was high in free sugar. Immediately after the ingestion of food, each patient was required to rinse his mouth well with an antiseptic, chew a stick of antiseptic paraffin and brush his teeth with a good brush and a dentifrice. The procedure was so rigorous that only twenty of the patients continued the experiment for as long as six months. At intervals during the test, the susceptibility to caries was determined by means of the chemical test. At the conclusion of the test, another x-ray and oral examination was made. The results are shown in Table 4.

As can be seen by the table, there was an appreciable decrease in susceptibility of every patient in the test, and in five of the cases the decrease was sufficient to give a negative chemical reaction. In fourteen of the cases, no caries developed during the test period, while, in six cases, caries developed. In three of the cases in which caries was observed, the condition was so slight that the examiner was doubtful whether it had not been missed on the first examination. In other cases, when cavities had developed, there was no question concerning the lesions, although none was large.

When one considers the various ways by which caries might be controlled and by which some degree of success has been obtained, it is quite obvious that no method fulfils the requirements of the profession. In each case, it is necessary to obtain complete cooperation of the patient in following a dietary régime which is too difficult for the average person to maintain. For this reason, no single method will ever be successful for the average patient in the practice of the average dentist. As a result, modified procedures have been tried by a limited number of practicing dentists. A pro-

cedure involving both the moderate limitation of free sugar and oral hygiene has been successful in general practice. Several dentists have obtained appreciable cooperation by the following procedure:

The cause of the disease is discussed in detail with the patient and the various means of control are outlined. As this is quite time-consuming, a definite fee is charged for the service. The patient is then instructed concerning the free-sugar intake, and when the reason is fully understood, a certain degree of cooperation can be obtained in most cases. In addition to this, the patient is instructed to clean the mouth immediately after the ingestion of food. As the recognized procedures are impossible under ordinary addition to this, the patient is instructed to use copious quantities of water when toilet facilities are not available. The water should be swished forcibly between and around the teeth before being swallowed. In this manner, much of the free sugar or acids can be removed before damage results.

I am informed that most patients who follow this procedure have an immediate decrease in carious lesions, and that when results are satisfactory, no further lack of cooperation is encountered.

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THE CLASS 5 AMALGAM RESTORATION

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Cavities of the fifth class are all on surfaces that are freely exposed to view. . . . They begin in the enamel, close to the line of the free margin of the gum. Hence the term, gingival third cavities.[1]

THROUGH examination of thousands of mouths of patients in the Stockton State Hospital in the past fifteen years, I have observed the general failure of amalgam fillings of Class 5, including cases from our own clinic.

A study of our past records showed that amalgam fillings of this type usually corroded and were unsightly. They became distorted or "bulged" with consistent regularity. The gum tissue coming in contact with most of them was frequently diseased, this fact leading to the assumption at that time that amalgam was incompatible with gum tissue. Lastly, recurrence of decay was often demonstrated at some point along the margins of those fillings that had been in use for a long time.

There are two factors in the success of amalgam, in the Class 5 cavity: 1. The cavity is surrounded by four walls. 2. There is ease of access. The principal disadvantage is the fact that the cavity is excessively wide, curved and shallow, a condition unfavorable for the condensation of amalgam resulting unless a special matrix is used. The usual matrix adaptations have proved unsuccessful in our hands.

The study of Class 5 amalgam fillings in extracted teeth showed that: 1. If they became distorted or "bulged" at the margins, the cavities had not been adequately undercut for retention form. 2. The rounded or jagged margins of the material itself indicated that the amalgam was permitted to retain an excess of mercury during packing. Black observed the rounding of amalgam margins from retention of excess mercury when he wrote[2]: "Whenever a very soft, sloppy amalgam is forced into a sharp angle, the mass will slightly withdraw from the angle immediately the pressure is removed . . . all such angles will be found rounded instead of sharp." 3. Recurrence of decay was usually manifest where the cavity was not sufficiently extended toward the mesial and distal line angles of the tooth and into immune areas occlusally. Many of us hesitate to extend the cavity sufficiently because of the esthetic factor.

Experiments in the mouths of our patients early in this program in which the cavities were extended well into immune areas and thoroughly undercut for retention were partially successful; that is, the restorations showed tighter margins, and recurrence of decay seldom occurred. However, the problem of condensation was not solved. Tarnish or actual corrosion was frequently noted within a few years.

The experience gained while developing the instruments for use in the Class II and mesioclusodistal cavities, following Black's suggestion that they should be as large as can well be used in the cavity, led to the idea of making condensers the approximate size and shape of the Class 5 cavity; that is, instruments large enough to hold the amalgam in place during packing without the aid of a matrix. Numerous trial instruments were developed. Gradually, the number was re-

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Read at the Twenty-First Annual Meeting of the Nevada State Dental Association.

duced to four for convenience and economy. Two additional designs by E. Carl Miller, of Cleveland, Ohio, have proved indispensable and have been added to the set of four. The total number of necessary points now is six. The six points were made adaptable to an adjustable double end handle which was devised by an instrument manufacturer. (Fig. 1.) These large and odd-appearing condensers obviate adapting a matrix and achieve condensation pressures heretofore thought impossible. The points are not patented.

CAVITY PREPARATION IN THREE STEPS

Step 1. The cavity is opened with a plain round bur, the size depending on the size of the proposed cavity. It should be of the same diameter as the fissure bur to be used in the following step.

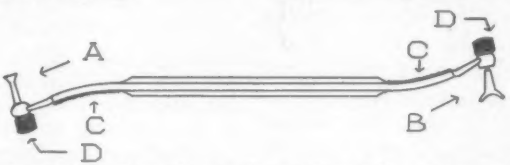

Fig. 1.—Adjustable handle. A, condenser for packing within cavity. B, overpacking condenser. C, finger rest. D, condenser release.

Step 2. The outline form is gained with a spiral-cut fissure bur sufficiently large to occupy one-half or more of the gingivoclusal width of the cavity. (Fig. 2.) If a bur of small diameter is used, an island of enamel-covered dentin will be isolated in the center of the cavity, and the removal of this island is very painful to the patient. By using larger burs, the operation can be completed with dispatch and less discomfort to the patient. The spiral bur planes the enamel wall, and the cavity is now ready for the retention form.

Step 3. A plain wheel bur is pressed into the cavity, into the angle formed by the cavity wall and the pulpal floor. The bur is revolved slowly and forced completely around the cavity, the shank of the bur riding the enamel margin while the cutting edge creates the retention form. (Fig. 3.) If a plain wheel bur is not handy, one may be fashioned from a plain round bur by stoning the face and removing the blades from the side connected with the shank, thereby preventing it from cutting toward the enamel wall, which may undermine it. When a cavity is extended beyond the boundaries of the mesial and distal line angles, the extreme curvature of the cavity necessitates the use of a 33½ inverted cone bur to attain the mesial and distal retention grooves. This condition is, however, unusual. The cavity is now ready to receive the amalgam.

EXTENSION FOR PREVENTION

It is imperative that the cavity be extended well out toward the mesial and distal line angles and occlusally to an area where an adequate finish line can be secured.

PREPARATION OF THE AMALGAM FOR CONDENSATION

The average Class 5 cavity takes a mix of about 8 grains of alloy to the specified amount of mercury as directed by the manufacturer of the particular alloy in use. Trituration can be accomplished with the mechanical amalgamator, which is equipped with the timing device graded in seconds or with the mortar and pestle. In using the mortar and pestle, it is advisable to jar or vibrate the mortar frequently during the mixing operation to assure complete amalgamation of stray particles of alloy. Packing amalgam containing unamalgamated particles is strongly condemned.

As soon as trituration is complete, the mass is rolled into a rope and cut into two pieces. The first piece is grasped in a linen cloth and squeezed to express the considerable excess of mercury present.[3] This dry piece of amalgam is made plastic by being rubbed several times in the same cloth, and possesses the necessary plasticity for condensation within the cavity. The second and remaining piece is permitted to remain on the bracket table, retaining its mercury until the first is used up. When ready for completion of the packing operation, the remaining amalgam is treated in the same manner as the first. The excess mercury is not removed from the entire mass at one time, but only from an amount which may be used up in about forty-five seconds.

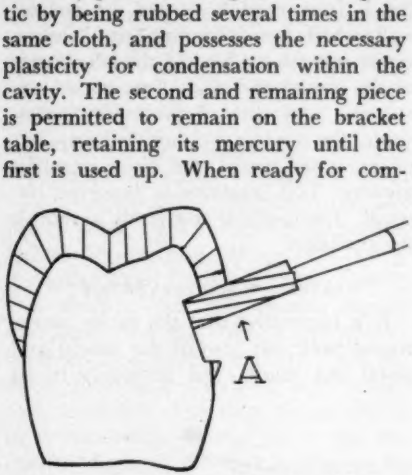

Fig. 2.—Spiral cut fissure bur (A).

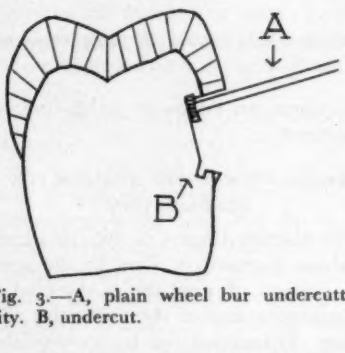

Fig. 3.—A, plain wheel bur undercutting cavity. B, undercut.

PACKING AND CONDENSING THE AMALGAM

A condenser is selected which is as large as will fit the cavity. The first piece of amalgam, which has been squeezed in the linen cloth and rubbed to plasticity as outlined above, is carried to the cavity and pressed into place with the condenser. Heavy pressure is exerted on the finger rest of the handle and, with a rocking motion, the amalgam is evenly compressed. During this stage, the excess soft amalgam will be forced to the walls of the cavity, where it may be eliminated from the field by withdrawal of the condenser from the cavity. The soft and mercury-saturated amalgam accumulates on the ledge of the condenser which is specially designed for this purpose. (Fig. 4.) When this amalgam has

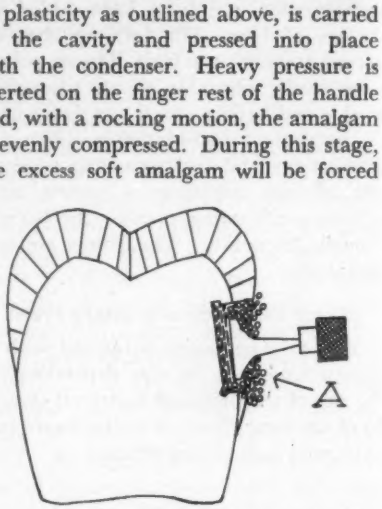

Fig. 4.—Small condenser packing within cavity. A, excess mercury-saturated amalgam that accumulates on ledge of condenser.

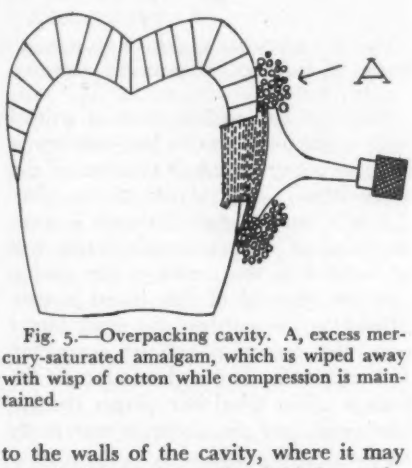

Fig. 5.—Overpacking cavity. A, excess mercury-saturated amalgam, which is wiped away with wisp of cotton while compression is maintained.

condensed, the final piece, which is still on the bracket table, is prepared for packing in the same manner as the first; that is, it is squeezed to express considerable excess mercury and plasticized by rubbing several times in the same cloth. It is then condensed into the cavity until the cavity is overfilled. The larger faced condenser, which fits over the entire cavity, is now employed for the final stage of condensation. (Fig. 5.) It is placed over the tooth surface and the overfilled cavity and, with steady pressure and a rocking motion, the mass is thoroughly compressed. The maintenance of steady pressure causes the excess of soft, mercury-saturated amalgam to "ooze" from between the tool and the tooth surface. If the pressure is released at this time, the mercury will diffuse rapidly into the filling. To prevent this, the excess semiliquid material is wiped off with a wisp of cotton as it accumulates under this constant compressive force. (Fig. 5.)

The packing of the average class 5 cavity takes from one to two minutes, the operation being completed while the amalgam is in the early stages of crystal growth. In larger cavities, which it may take several minutes to pack, the "installment plan" of condensation should be used. This method[4] assures fresh amalgam every three minutes, to the completion of the restoration.

When condensation is complete, carving may be instituted immediately. If this technic has been followed, the setting time will have advanced to a point where it is advisable to carve at once rather than to wait for several minutes.

FINISHING THE RESTORATION A WEEK LATER

Finishing under the free margin of the gum should be done with gold files. Craig's files No. 11, both right and left, are ideal for this purpose. Filing imparts a smooth, burnished surface and does not injure the gum tissue, while the use of sandpaper disks in this location is very severe. Sandpaper is excellent for finishing the remaining parts of the filling.

POLISHING

Polishing creates heat; heat affects amalgam.[5] Stiff black-bristled brushes charged with abrasive paste and continuously cooled with water are safer than rubber cups. An excellent abrasive paste can be made by mixing medium grit pumice with glycerin in a plaster bowl. Toothpaste is added to whiten and flavor the mixture, and the addition of a liberal amount of denture powder holds the mass together.

The final polishing that brings out the delicate platinumlike color is done with tin oxide, zinc oxide or whiting on a soft bristle brush thoroughly saturated with water. Many of us have believed that polishing powders should be used dry, but it has been my experience that a more lasting polish and a deeper luster can be obtained by greatly diluting the powder with water. At no time should the powder be allowed to become dry.

TARNISH AND CORROSION

Experiments in our clinic have shown that thoroughly condensed amalgam packed into a carefully prepared cavity will neither tarnish nor corrode noticeably if the patient pays reasonable attention to oral hygiene.

VALUE OF AMALGAM

This paper has dealt primarily with the class 5 restoration of bicuspids and molars. However, the efficacy of amalgam is not confined to these teeth. In our clinic, amalgam is used almost exclusively in anterior teeth because it maintains its color and luster indefinitely, and therefore it is indicated as a filling material anywhere in the mouth.

SUMMARY

1. Class 5 cavities should be well extended into immune areas and carefully undercut for retention form.

2. Specially designed condensers are used for packing the amalgam to eliminate the need for a matrix.

3. A well-made amalgam that is carefully polished will retain its color and luster indefinitely if the patient pays reasonable attention to oral hygiene.

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PAGET'S DISEASE OF THE MAXILLAE AND MANDIBLE: CLINICAL ANALYSIS AND CASE REPORTS

By IRVING GLICKMAN,* D.M.D. and HENRY S. GLIDDEN,† M.D., Boston, Mass.

BONE changes in the maxillae and mandible are of particular significance to the dental profession. Clinical and roentgenographic analyses of periapical and periodontal bone changes are prerequisites for the intelligent clinical management of the dental patient. Because diagnosis of the bone changes in the immediate vicinity of the teeth often suffices for routine dental therapy, the deeper implications of the osseous structure of the jaws as components of the general skeletal system are often overlooked. Similarly, the dentist is prone to look upon general skeletal dystrophy as a pathologic rarity of academic interest, having a vague bearing upon the maxillae and mandible, but not especially pertinent in routine practice.

It is our opinion that an understanding of the modifications in bone function and structure that result from skeletal dystrophy offers valuable aid in the diagnosis and rational therapy of more oral conditions than is generally suspected. For this reason, an analysis of three cases of Paget's disease in which the bones of the jaw were involved is presented. The purpose of this paper is to demonstrate the nature of the clinical and roentgenographic changes seen in the maxillae and mandible when these bones are involved in Paget's disease. A brief introductory review of Paget's disease and its relation to the jaws is included. Many of the other aspects of Paget's disease can be found in the literature.

Paget's disease is recognized clinically as a chronic bone dystrophy of middle age occurring in either of two forms: a disseminated, or polyostotic, form, in which many bones are involved, either simultaneously or progressively, and a monostotic, or localized, form, in which the clinical changes are limited to one bone in the body. Whether the latter

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form represents an early or undeveloped stage of the disseminated condition, or whether it may be associated with microscopic changes in other bones that escape clinical detection is open to question.[1] Both types are represented in this report.

It was estimated that approximately 500 cases of disseminated Paget's disease had been reported up to 1933. Other clinical surveys reported an incidence of seven cases in 285,000[2] and fifteen in 237,000.[3] Involvement of the maxillae and mandible as a clinical phase of the disseminated Paget's syndrome or as the site of the monostotic lesion has not been commonly observed. This may be due, in part at least, to failure to examine

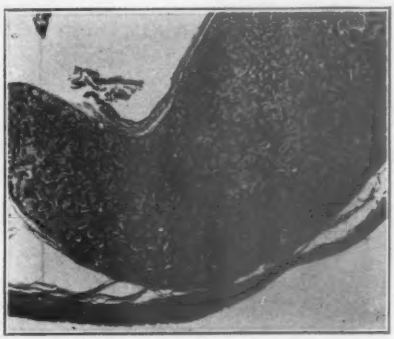

Fig. 1. (Case 1).—Right maxilla, showing regular honeycomb pattern of bone trabeculae which has replaced previously existing bone structure. Demarcation between peripheral and cortical zones is absent. (Hematoxylin and eosin; ×8.)

these bones either clinically or at necropsy. However, case reports have appeared in which involvement of the maxillae[4, 5, 6, 7, 8] or mandible[9] was part of the clinical picture of Paget's disease. A survey[10] of the roentgenograms of the jaws in 138 cases of generalized Paget's disease revealed involvement of the maxillae in twenty cases and the mandible in three cases.

From these figures, it appears that generalized Paget's disease is a rather rare condition in which clinical changes in the maxillae and mandible are not very common. However, in Jaffe's[1] review of Schmorl's microscopic study[11] of the skeletal system (not including the jaws) of 4,614 patients past 40 years of age, several stimulating facts were revealed, warranting the attention of the oral diagnostician. First, on the basis of microscopic evidence, Paget's disease was present in 138 of 4,614 cases, an incidence of 3 per cent. Second, there were cases in which microscopic changes were the only evidence of Paget's disease. Third, contrary to previously established clinical impressions, the spine, including the sacrum, and not the skull, tibiae and femora, were the bones most frequently involved. Fourth, Paget's disease was frequently found in the lumbar vertebrae, sacrum or bones of the pelvis, separately, or in combination, in the absence of gross manifestations in other bones.

Although the microscopic criteria used in this study have since been qualified somewhat, the fact that microscopic bone changes were detected in the absence of gross morphologic alterations points to the limitations of clinical observations alone in the detection of Paget's disease in any bone in the body.

In Paget's disease, the most prominent histologic changes in the bones are the loss of the normal osseous structure and alteration in the trabecular pattern with replacement by a newly formed excessive honeycomb of bone trabeculae. (Figs. 1, 2, 3 and 4.) The normal marrow tends to be replaced by a markedly vascular fibrous connective tissue. (Fig. 5.) Exceedingly active bone formation and resorption ultimately produces in the bone a mosaic pattern characterized by multiple curvilinear[12] cement lines. (Fig. 5.) Porosity of the bone, which is thought to be the result of diminution in the total mineral content, accompanies these changes.

Enlargement, elongation and deformity of the individual bones involved are the gross morphologic features associated with the histologic changes. The clinical picture discussed by Paget[13] and subsequently considered pathognomonic of the disease results when many bones are distorted. The composite disseminated syndrome usually appears in patients past 40 years of age and includes the following features: bowing of the lower extremities, produced when the softened and elongated long bones yield to the body weight; marked diffuse enlargement of the skull; reduction in height accompanying accentuated dorsal and lumbar curvatures of the spine, and widening of the pelvis. The resultant picture is strikingly simian in appearance, with the head bent over the chest, the chest bent over a protruding abdomen and the entire trunk bent over the lower extremities, with the arms appearing unnaturally long and dangling in front.

Pain in the bones involved usually accompanies and often precedes the objective clinical symptoms. In addition, impairment of sight and hearing is common.

When involved either as a part of the disseminated syndrome or in the monostotic form of the disease, the maxillae and mandible are usually markedly enlarged. Spaces develop between the teeth because of the enlargement. In some instances, the entire maxillae or mandible is enlarged; while, in others, the enlargement is limited to a portion of the bone. It is important to recognize that microscopic changes consistent with Paget's disease may occur in the maxillae and mandible without pronounced clinical enlargement. This fact emphasizes the diagnostic value of the x-rays in determining whether the mandible or the maxillae are involved in Paget's disease. It must, however, also be recognized that it is possible for microscopic bone changes to escape detection by the x-rays. Negative x-ray findings do not conclusively rule out Paget's disease. The

Fig. 2.—Edentulous maxilla, showing normal trabecular pattern and relation of peripheral cortical zone to inner cancellous region. (Hematoxylin and eosin; ×8.7.)

roentgenographic criteria of diagnostic value in the recognition of Paget's disease in the mandible and maxillae include:

(a) Alteration in the size and shape of the marrow spaces and the trabecular patterns. The histologic basis for this change can be observed by comparing Figures 1 and 2 with Figures 3 and 4.

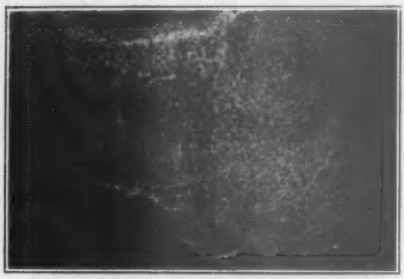

Fig. 3 (Case 1).—Intra-oral x-ray film of right maxilla. (Figure 1 was taken from this area.) Regular pinpoint cancellous spaces are separated by a hazy diffuse meshwork of finely linear trabeculae. The irregularly escalloped peripheral outline is to be noted.

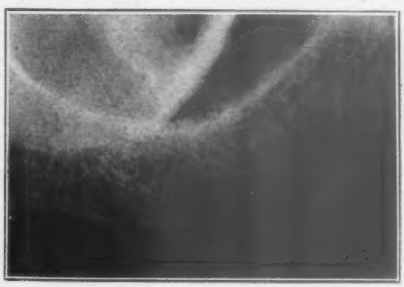

Fig. 4.—Intra-oral x-ray film of maxilla; showing normal roentgenographic appearance of edentulous maxilla in region corresponding to Figure 3.

(b) Replacement of the clear-cut heterogeneous trabecular pattern of the maxillae and comparatively regular arrangement of the trabeculae of the mandible by a hazy, diffuse meshwork of closely knit, fine linear trabecular markings; absence of demarcation between the cortical and cancellous regions, and the presence of scattered circumscribed, sharply demarcated areas of bone rarefaction or condensation.

(c) Alteration in peripheral contour.

(d) Absence of clear cut lamina dura in relation to root surfaces.

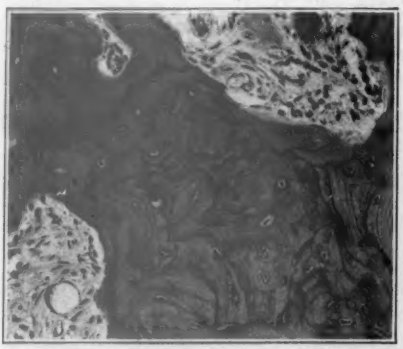

Fig. 5 (Case 1).—Mosaic lamellar pattern and multiple "curvilinear markings" characteristic of Paget's disease. The fibrous connective tissue in the marrow spaces is to be noted. (Hematoxylin and eosin; ×210.)

Fig. 6 (Case 1).—Pelvis, lower lumbar and sacral vertebrae; showing rarefaction and sclerosis. The enlargement and deformity of the pelvis are to be noted.

REPORT OF CASES

CASE 1.—*History.*—J. E. H., a man, aged 66, admitted to Tewksbury State Hospital August 6, 1934, three months previous to admission fractured the bones of the left leg in several places. The fragments were pulled

together and the leg was splinted. The patient removed the splint a few weeks later because of discomfort. Since then, he had been free from pain and able to walk about in a normal manner.

Physical Examination. — The patient weighed 125 pounds and was 4 feet 10¾ inches tall. The thorax was short and thick and showed a markedly increased anteroposterior diameter. There was kyphosis of the dorsal vertebrae. The lungs were clear and resonant throughout. The heart was slightly enlarged to the left, but the sounds were of fair quality and intensity. A soft blowing systolic murmur was heard at the apex and a faint diastolic murmur was heard in the pulmonic areas. The blood pressure was 172/90. The radial arteries were markedly sclerosed. The abdomen was negative. The extremities showed enlargement of the left knee joint with separation of the patella.

Clinical Diagnosis.—The diagnosis was mitral regurgitation, arteriosclerosis and moderate hypertension. Survey of the progress notes shows various minor complaints for which the patient was successfully treated, including a rather diffuse type of arthritis.

Fig. 7 (Case 1).—Cranium, showing coarse mottling and rarefaction.

Fig. 8 (Case 1).—Intra-oral x-ray film of left mandible, showing hazy, diffuse meshwork of finely linear trabeculae and absence of clear-cut demarcation between the cancellous zone and cortical regions. The thickened inferior cortical zone, which appears to extend beyond the line marking previously existing border of mandible, is to be noted.

Fig. 9.—Intra-oral x-ray film showing normal roentgenographic appearance of edentulous mandible in region corresponding to Figure 8.

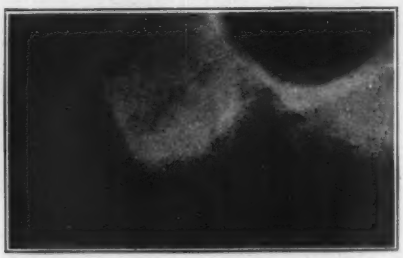

Fig. 10 (Case 2).—Intra-oral occlusal x-ray film of right maxilla, showing hazy, diffuse meshwork of finely linear trabeculae and radiolucent area in relation to periostium. The marked radiopacity in the center of the film is the result of superimposition of the malar bone.

In October 1937, an x-ray examination resulted in the diagnosis of Paget's disease. (Fig. 6.) Especially striking changes were noted in the skull. (Fig. 7.)

Outcome.—Until March 3, 1941, the patient was ambulatory and did not require

much attention. Thereafter, he required constant attention and was either kept in bed or allowed up in a wheel chair. April 10 marked the onset of the terminal illness, death ensuing April 12.

Laboratory work done at various times showed a blood calcium of 7 mg.; phosphorus, 3.2; phosphatase, 8 Bodansky units. The nonprotein nitrogen and blood urea nitrogen were within normal limits.

Abstract of Postmortem Examination.—The body was that of a misshapen elderly white man exhibiting extreme deformity of the legs. There was marked edema and some pigmentation about the feet and ankles. The abdomen was normal. The chest was barrel-shaped and showed marked flaring of the ribs. The head was enormously enlarged and the hair was thin and gray. Eyes, ears and nose were normal.

The bones of the skeleton could be cut with the greatest ease. All bones were markedly thickened and presented a wide band of cancellous bone between the thinned out tables. The skull cavity was very shallow and the brain was compressed, flattened and curiously oval-shaped. In addition to the bones of the skull, the vertebrae, sternum and extremities showed marked enlargement and in all instances could be cut readily with a knife. Microscopic diagnosis was osteitis deformans (Paget's disease, Figs. 1, 5), coronary sclerosis, acute myocardial infarction, fibrinous pericarditis, terminal bronchopneumonia, arteriosclerosis and passive congestion of the liver, spleen and kidneys.

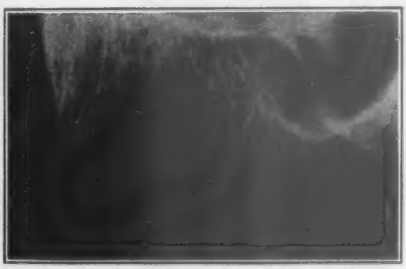

Fig. 11.—Intra-oral occlusal x-ray film, showing normal appearance of region corresponding to Figure 10.

Oral examination (April 15) showed that the mandible and maxillae were edentulous. There was generalized enlargement of the mandible with marked anterior mandibular protrusion. The maxillae were slightly enlarged in the region of the tuberosities. The buccal and gingival mucosae were normal.

X-ray examination of the right maxillae (Fig. 3) revealed regular pinpoint cancellous spaces separated by a hazy, diffuse meshwork of finely linear trabeculae. There was an irregularly escalloped peripheral outline. The left mandible (Fig. 8) showed a hazy, diffuse meshwork of finely linear trabeculae and absence of clear-cut demarcation between the cancellous zone and the cortical regions. In addition, a thickened cortical zone along the inferior margin appeared to extend beyond a thin line which marked the previously existing mandibular border.

CASE 2.—*History.*—L. R., a man, aged 47, admitted to Tufts College Dental School April 24, 1940, had had the upper right posterior teeth removed eight to nine years before. At an indefinite time after removal of the teeth, gradual enlargement of the upper right maxilla was noted. The patient associated the growth with the extraction because of the extensive operative procedures required to remove the teeth. The patient complained of impairment of hearing in the right ear of four years' duration.

Examination.—The mouth was edentulous, with a painless, bulbous, irregularly shaped enlargement extending from the posterior border of the right maxilla to the midline of the jaw. The lesion extended buccally, palatally and downward and was not sharply demarcated from the surrounding regions. There was no lymph node involvement.

The x-ray examination of the right maxilla (Figs. 10 and 11) showed that the trabecular pattern of the bone differed markedly from the usual and presented a hazy, diffuse meshwork of finely linear trabeculae.

*Operation.**—An exostosis of the right maxilla was removed after the deflection of mucoperiosteum. The exostosed bone process could be removed with a chisel and slight hand pressure. The bone was cancellous and very vascular.

Diagnosis.—Paget's disease was the tentative diagnosis. The microscopic diagnosis was bone dystrophy consistent with Paget's disease.

*By Richard H. Norton, professor of oral surgery, Tufts Dental School.

CASE 3.—*History.*—M. S., a woman, aged 62, admitted to Tufts College Dental School February 4, 1942, six years before had sought medical advice because of pains in the leg and back. A diagnosis of Paget's disease was made at that time. The general appearance upon admission was typical of disseminated Paget's disease.

Oral Examination.—There was no alteration in the size or contour of the mandible or maxillae. The caries incidence was high, the oral hygiene good. There was generalized gingival recession exposing approximately one-third of the root surfaces. There was slight marginal gingivitis with no marked gingival ulceration. The teeth were firm.

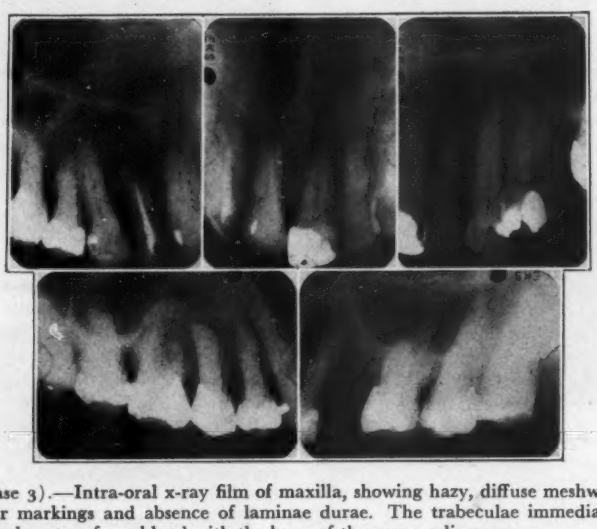

Fig. 12 (Case 3).—Intra-oral x-ray film of maxilla, showing hazy, diffuse meshwork of closely knit trabecular markings and absence of laminae durae. The trabeculae immediately adjacent to the individual root surfaces blend with the bone of the surrounding area.

X-ray examination revealed the following significant facts regarding the bone:

a. The trabecular pattern of the bone of the maxillae differed markedly from that usually seen in patients of a similar age group.

b. The trabecular pattern of the bone in the mandible was not unusually altered.

c. The maxillae were characterized by a hazy, diffuse meshwork of closely knit fine linear trabecular markings. The sharply demarcated laminae durae, in relation to the root surfaces, were not present. The bone trabeculae immediately adjacent to the individual root surfaces blended imperceptibly with the bone of the surrounding area (Fig. 12).

It is of particular interest that, despite the marked change revealed roentgenographically in the bone of the maxillae in this case, clinical examination revealed no unusual alterations in size or shape.

SUMMARY

In three cases of Paget's disease, one was first recognized through dental channels.

In Case 1, which was typical of the disseminated type, many bones, including the maxillae and mandible, presented alterations which were grossly visible. Case 2 might be considered the monostotic type since only the right maxillary tuberosity was clinically altered. From the available data, it was not possible to rule out Paget's changes in other bones in this case.

The roentgenographic and histologic changes in both the maxillae and the mandible in Case 1 and in the right maxilla in Case 2 were consistent with Paget's disease.

Case 3 presented the typical picture of disseminated Paget's disease. Neither the maxillae nor the mandible showed any gross morphologic change suggestive of pathologic involvement. Intraoral x-ray examination, however, revealed marked alterations in the bone of the maxillae which were consistent with Paget's disease.

The following facts pertaining to the jaws can be noted regarding Paget's disease:

The only clinically visible change in Paget's disease may occur in a localized area in the jaw.

Although the jaws may be enlarged in Paget's disease, it is possible for these bones to be involved without presenting any clinically detectable morphologic alterations.

A history of impaired hearing associated with a slowly developing deformity of the maxillae warrants consideration of Paget's disease as a possible diagnosis.

The x-rays may reveal marked alteration in the size, shape and distribution of the bone trabeculae of the jaws in the absence of clinically detectable alterations. X-ray examination of the jaws should not be limited to the detection of pathosis of dental origin, but should include a study of trabecular patterns.

Whenever possible, bone biopsies should be made to investigate marked alterations in trabecular patterns revealed roentgenographically.

This study emphasizes the necessity for focusing attention upon the broader aspects of constitutional disease and its relation to the oral cavity both in the practice of dentistry and in the fields of dental education and research.

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ETIOLOGY AND CLASSIFICATION OF PARODONTOSIS (PYORRHEA ALVEOLARIS)

By Rowe Smith, D.D.S., Texarkana, Ark.

I SHALL approach the question of etiology and classification of parodontosis, or pyorrhea alveolaris, as a private practitioner especially interested in a better understanding of all the fundamental etiologic factors involved, and in a classification of the various types which will, as nearly as possible, give a definite picture of the disease, based on the etiology, pathogenesis and clinical picture.

Much of my parodontal experience has been with a dental group working in sympathetic cooperation with a medical group.

It seems to me that the most urgent parodontal problem is etiology, the consideration of classification, terminology or nomenclature being of secondary importance. However, we should eliminate as far as possible the existing confusion as to nomenclature. Almost every author has a different name for the same parodontal or gingival condition. Few seem to understand another's terminology, and often the same condition is called two or more different names in the same article. It is my opinion that the lack of knowledge as to etiology is chiefly responsible for the confusion as to terminology. The term "pyorrhea" or "periodontal disease" is commonly given to all types of diseases which affect the gingivae and dental supporting tissues.

The Becks-Orban amended classification for the American Academy of Periodontology appears to me to be very good, and it can be changed when more definite knowledge on etiology is obtained. It can be easily understood that either term, parodontosis or parodontitis, signifies an involvement of the alveolar bone and periodontal membrane, as well as the gingivae.

I agree that there seem to be at least two different types of disease which destroys the alveolar bone. However, I believe that all cases of parodontosis become inflammatory, and therefore become a combination of parodontosis and parodontitis.

When we say "parodontal disease," we should understand that it is a general term, meaning any type of disease which attacks the gingivae alone or the gingivae and the supporting tissues of the teeth.

In the past, according to my experience, too much importance has been placed on local factors alone. In a large percentage of cases, it was impossible to find any perceptible local causative factors, such as evidence of lack of oral hygiene, calculus formation on the root surfaces of the teeth, an abnormal position of the teeth and irritating dental prostheses. Often, when these local factors did exist and were corrected, the tissues involved showed little tendency to repair, and it was difficult to maintain any repair that did take place. Frequently, the disease continued, spreading to other areas, and, in some cases, removal of all teeth failed to stop bone resorption.

Many types of parodontal disease respond to local treatment, yet a large percentage make little or no response to

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application of the same local treatment. As a result of being completely baffled as regards local factors and their elimination, I became interested in the possible systemic aspect of parodontal disease, especially in the type termed "parodontosis," formerly termed by Gottlieb "diffuse atrophy," with special attention to the younger patients. In cooperation with a medical group, I began an investigation of the systemic background of these cases.

My experience[1] and the experience of others indicate that thyroid disturbance is one of the common systemic factors in parodontosis. In the cases coming under my observation, it appears that hyperthyroidism and hypothyroidism show nearly the same parodontal end-result, and I find hypothyroidism the most common systemic complication. Of eighty-three cases examined, basal metabolic readings revealed that forty-eight had hypothyroid function and three hyperthyroid function.

I have further observed parodontosis associated with thyroid disturbance much more frequently in young women than in young men. Many of the young woman patients complain of irregularity of menstruation and the impossibility of pregnancy, and laboratory findings showed a large percentage to be suffering from secondary anemia, of the hypochromic, microcytic type.

Cases of parodontosis associated with thyroid disturbances should be considered a distinct type and classified as such. In reviewing the literature on the systemic aspect of parodontal disease, I do not find one author who does not consider thyroid disturbances in relation to parodontosis; but definite proof that thyroid dysfunction produces parodontosis would not solve the problem completely, because some types of parodontosis are apparently a reflection of other systemic disorders, nutritional deficiencies or disease processes elsewhere in the body; for example, diabetes, scurvy and tuberculosis. However, it would be an outstanding contribution to the solution. At least, there seems to be enough evidence to warrant sufficient investigation to prove or disprove the relationship.

The greatest hindrance to control of parodontosis is that all parodontal disease has been too long, and still is, considered a local condition, requiring only local treatment. The possibility of a systemic etiologic complication has been overlooked or ignored by the majority of dentists, including many periodontists. Here, I should like to urge members of the dental profession to begin a large scale investigation, in cooperation with the medical profession, of the systemic aspect of so-called pyorrhea alveolaris, including the "dry" type. It should prove helpful to include in the investigation persons giving no clinical or roentgenographic evidence of dental or oral disease, that a comparison or contrast might be drawn. To date we have studied twenty-eight such cases, and only one of these cases showed a thyroid disturbance.

We have reached a stage where the technic of local treatment has been almost perfected. The histologic and roentgenographic aspects seem exhausted. The picture is seemingly well understood. We have much roentgenographic and histologic evidence of the effect of parodontosis, but little definite knowledge of the etiologic aspect. As a result, dental treatment is often directed toward elimination of symptoms rather than elimination of etiologic factors.

It is not my purpose to advocate discarding local treatment. So far, few reliable data have been presented to show that parodontal lesions can be made to heal by application of systemic treatment alone, as has been the case in treating lesions caused by vitamin deficiency when secondary infection has not oc-

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curred. From a practical standpoint, treatment of parodontosis should be a combination of medical treatment and dental treatment. Adequate dental treatment, for most cases, must include parodontal, surgical care, exodontia and restorative measures.

The therapy of pyorrhea alveolaris, or parodontosis, is still in the "shotgun" stage, comparable in status to the therapy of pernicious anemia prior to the discovery of the specific effect of liver.

Physicians have enlisted and still do enlist the aid of dentists in the search for focal infection for relief of systemic conditions, caused or made worse by possible dental infection, such as rheumatism. It is my opinion that dentists must now enlist the aid of physicians in the search for etiologic factors associated with parodontal disease.

Just as surely as there are definite causes for all life ending in death, and for night following day, there must be definite causes of the various types of parodontal disease which attack and destroy the supporting tissues of the teeth. If we are to maintain our position in dental science, we must solve this urgent problem.

A PROCEDURE FOR MAKING A LOWER PARTIAL DENTURE WITH A SPRING STRESSBREAKER

By ROLLAND R. JONES, D.D.S., Portland, Ore.

THIS paper is to be in the nature of a sequel to an article appearing in the March 1941 JOURNAL. It is to be a step-by-step discussion of the construction of a lower partial denture that will meet the requirements listed in that article; namely, that it should (1) be esthetically satisfactory; (2) be sturdy; (3) be easy to keep clean; (4) have correct occlusal relationship; (5) use the maximum saddle bearing area; (6) avoid prolonged pressure on soft tissues; (7) assist saddles to return to tissue-rest position; (8) deliver the maximum chewing load to abutments; (9) avoid strain on abutments; (10) assist abutments to support each other, and (11) be maintained firmly in position.

Since study models are desirable in all partial denture work, we start with such models. They should be made from well-extended impressions. The lower model is then oriented to a clasp surveyor so that the height of convexity of the abutments will be indicated in its correct relationship to the desired line of insertion of the denture. (Fig 1.) Later on, the clasps, when waxed up, are made to conform to the height of convexity.

Before individual impressions are taken of the abutment teeth, any desirable anatomic changes are made. Then the individual impressions are taken in sections with impression compound. (Fig. 2.) A special tray, made to include the occlusal, the lingual and one proximal surface, has a parting plate extending occlusally from the buccoclusal angle of the tray, which acts as a handle and as a guide for reassembling the sections, since the buccal section of compound is molded against it. From these impressions, investment models are made; and

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on these models, the clasps are waxed up. In order to provide material for future interproximal lugs, the sprues are inserted in the proximal parts of the wax patterns, and they are enlarged to provide extra bulk from which the lugs can be cut at the time the first supplied teeth are set on the saddles. If preferred, the investment models can be made from colloid impressions.

As regards the fit of clasp attachments, when provision for movement between the saddles and the abutments is to be made by a stressbreaker, the clasps should be made to grip the teeth rigidly and firmly and yet cover as little of the enamel surface as is practical. (Fig. 3.) It is frequently possible to so design a

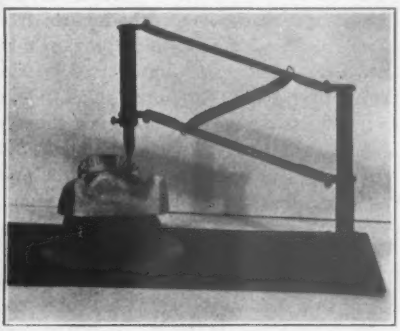

Fig. 1.—Inexpensive and efficient clasp surveyor made from parts obtained from hardware store.

clasp that its greatest bulk is occlusally from the height of convexity. It will then be supported by more than an occlusal rest. Fingers can be extended beneath the height of convexity for retention, and there is then a firmly gripping clasp without undue coverage of the enamel in areas of susceptibility.

To return to the study models: The saddle and lingual bar areas are roughly outlined. Then, from impression compound, saddles with occlusion rims are formed on these models so as to stand a little above the occlusal plane. The retromolar pads are used as guides to establish the height of the occlusal plane at the heels. They are not commonly used as such guides, but I have found them a great help. These pear-shaped pads appear, as you no doubt have noted, just back of the mandibular second molars and on the same occlusal level. The use of the level at which these pads blend into the posterior tissues will prove a simple and accurate means of determining the height of the heels of the bite planes, that is the level about five-sixteenths inch back on the pads.

After the saddles and their occlusion rims are formed, a temporary lingual bar of iron or brass is shaped to the lingual bar area, lying high above the frenum.

Fig. 2.—Special trays made with parting plate. a, empty formed tray. b, one-half of impression in position.

It is extended well into the saddle areas, with a loop or crook at each end to anchor it firmly in the compound. This bar is heated, one end at a time, and inserted in the saddles, tying them together. (Fig. 4.)

The temporary lingual bar denture being complete, the next step is its adjustment in the mouth in correct occlusal relationship to the antagonizing teeth. The occlusal surface of the occlusion rims is warmed and the patient is asked to close, heating and trimming being continued until there is no compression

or displacement of tissues from occlusal pressure.

To fit the saddle areas, we first knife-trim all muscle borders until border tissue movements are entirely free. Next, to secure adaptation under functioning conditions, a green tracing stick is used in the ridge areas, one side at a time, and the patient is asked to close for functional adaptation, with the compound flowing toward the crest of the ridge. Then the green tracing stick is used on the border areas, one border of one side at a time, and, at each step, muscle trimming is accomplished by extreme movements of the involved parts.

For an impression of the lingual bar area under functional conditions, low

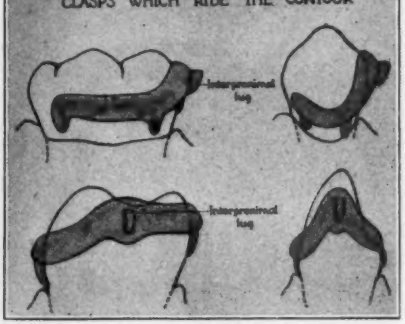

Fig. 3.—Clasps receiving support from buccal and lingual contours.

fusing compound is traced around the temporary lingual bar and is adapted by the tongue in its extreme movements and is molded to the lingual surfaces of the incisors.

At this stage, the firm-gripping clasps, which were previously waxed up as outlined on the study models, and were cast to the investment models, are adjusted. In order that the temporary denture of compound and these clasps may be seated without the clasps disturbing the position of the saddles on the tissues, the compound of the occlusion rims adjacent to the abutments is softened. Then the saddles are moved or worked about in position until they are free from contact with the clasps. This is accomplished one side at a time.

Lastly, a narrow strip of black carding wax, about three-sixteenths inch wide, is sealed on the occlusal surface of each occlusion rim, extending from the first bicuspid to the center of the second molar area. The wax is softened, centric registration is made and the wax is trimmed so that there is no overhang.

The temporary denture is now completely fitted and becomes the primary part of the final impression. The second part is an over-all impression. For this, a tray with the labial flange removed is used. It should be large enough to provide at least three-sixteenths inch of free space on all sides, for it is important that the compound at no point shall be less than three-sixteenths inch thick. This over-all impression extends over the occlusion rims, the clasps and the teeth, but leaves the labial surfaces of the teeth and the buccal arms of the clasps exposed. A labial face-piece completes the impression, which is then removed in sections. To facilitate its removal, after the labial face-piece has been removed and the buccal arms are exposed, an instrument can be used to lift off the clasps by hooking under the exposed arms. This will permit the removal of the clasps in the impression without distortion. The carding wax imprints are not distorted by the warmth of the over-all impression, the wax retaining the imprints without mutilation.

We have now attained one of our main objectives. We have an impression of the saddle areas under functioning conditions, but with the relationship to the abutments and likewise to the clasps established in tissue-rest position.

Any one believing that the tissues were compressed when the over-all impression was taken should recall that during the hardening of three-sixteenths inch of

compound, the tissues will have time to regain their normal contour or to assume rest position. Tissues are compressed by compound only when a thin layer is supported by a harder foundation. Compression might result if less than three-sixteenths inch of compound were used between the over-all impression tray and the primary impression.

Because the impressions of the occlusal portions of the clasps were not distorted in removal, the clasps are seated accurately in the impression; or, if they have been removed, they can be reseated accurately. The labial face-piece, which included the labial or buccal arms of the clasps, is an added check on the clasp relationship and also accurately shows the labial form of the teeth. The compound around the gingival portions of the clasps is cut away so as to expose the clasps; the impression is boxed and poured in stone, and the stone is prevented from overheating by dipping in cold water. When the stone is set, the impression tray is snapped off while cold and the over-all impression compound is carefully heated and removed before it becomes very soft. That leaves the occlusion rims and their black wax record on the lower cast or model as a guide in mounting the lower cast in centric relation to the upper cast. After the casts or models are accurately mounted on the articulator, all of the compound of the saddles and the occlusion rims is removed and the clasps are carefully loosened from the stone cast. Where the gingival compound was cut away, there are definite shoulders of stone, which are preserved as an aid in reseating the clasps accurately.

The next step is to make the gold stressbreaker framework. A lingual bar of round wire of 11-gage (hylastic or similar wire) is adapted in the muscle-trimmed lingual area and extended well into the saddle areas. If the tissues lingually from the incisors slope backward, two thicknesses of adhesive tape is used to hold the bar away from the cast. If the lingual tissue is perpendicular, one thickness is used. Where there is a concavity on the lingual aspect, the bar is set so that it will just clear the tissue in going to place.

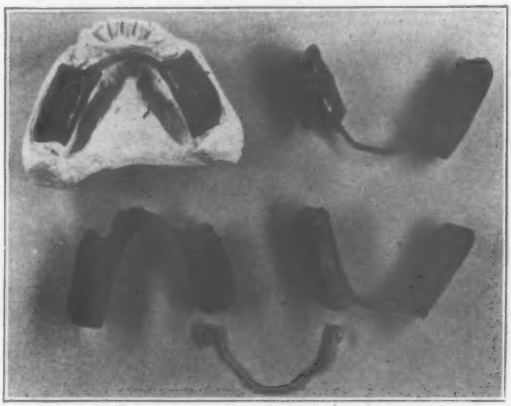

Fig. 4.—Temporary lingual bar denture forming primary part of final impression.

Parallel to this lingual bar and lying just incisally from it, another lingual bar of 11 gage is adapted closely. (Fig. 5.) The bar is turned abruptly upward at points opposite the distal contact points of the abutment teeth. These upturned

portions are kept parallel to the line of movement of the anterior ends of the saddles as controlled by the stressbreaking lower bar. They abut these anterior saddle ends, but must not obstruct their movements toward the tissue, and they must not open any space in which tissues might be pinched. The upper bar is then soldered to the clasps just lingually from distal or body portions, forming substantial tangs or standards.

Finally, the two bars are joined by a weld or solder at a point midway between the abutments, or the weld may be shifted toward the more stable abutment. The weaker one can thus be relieved of some of its share of the load, just as the load on a crossbar can be shifted by shifting the weight to vary the leverage.

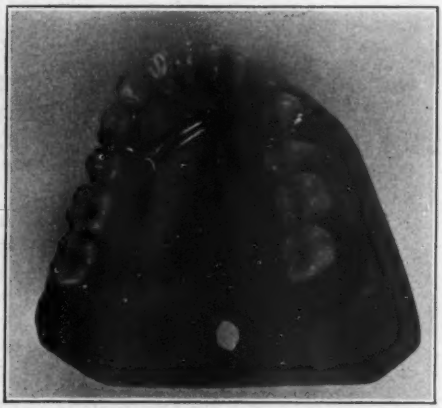

Fig. 5.—Partial denture using cast clasps, with tangs formed from upper bar.

Sometimes, there is not room for an adequate stressbreaker because the distance between the abutments is too slight. It is then necessary to carry the lower or stressbreaker bar along the lower borders of the saddles and enter them farther back. The desirable spring span is 15 mm. It should not be less than 10 or 12 mm., nor more than 18 or 20.

The framework is now assembled and we are ready to attach saddles to it. With care to avoid tension on the free ends of the lower bar, these ends are attached to tinfoil saddles with hard sticky wax.

The residual sprues are then fashioned into interproximal lugs to fit loosely into slots cut in the marginal ridges of the first supplied teeth. The object here is to bridge the joints and prevent food from packing between the clasps and the movable teeth. When the first supplied teeth are properly adjusted, the others are set in place and waxed in. All of the supplied teeth are set with a plus occlusion; that is, with the articulator slightly opened, to allow for tissue compression as well as for some occlusal adjustment and milling. Since the relationship between saddles and attachments has been established at tissue-rest position, it is important that the occlusion be high enough so that, when the saddles compress the tissues, there will be efficient contact against the antagonizing teeth. After processing, all overhanging denture base material must be removed from around the upper bar, so that the springs may function unhampered as the saddles move.

When one has come to feel a mastery of the procedure, he may add workmanship and finish to the case by waxing up and casting in one section the clasp, the

tang, the interproximal lug and also a spur. (Fig. 6.) The spur extends downward from the tang or standard at the point where the latter is to be attached to the upper bar. It laps or lies over the lower bar, but is not attached to it. It is merely to reinforce the appliance against distortion in cleaning, and, of course, must not hamper stressbreaker action. The sprue, as before, is attached to the wax pattern so as to form the interproximal lug later. A more complicated casting results from combining these features and makes the taking of the primary part of the impression somewhat more involved, but a little ingenuity readily surmounts the difficulty and the finished result warrants the effort.

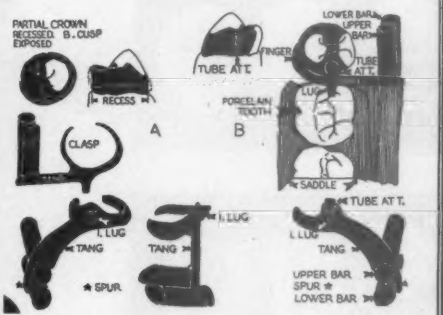

Fig. 6.—Attachment, tang, interproximal lug and spur cast in one piece: A, encircling clasp for partial crown including lingual cusp; B, tube attachment with buccal arm or finger for partial crown, not including lingual cusp.

An abutment can be transferred to the model by the above-mentioned impression procedure with accuracy, and the attachments can be completed on the cast, or model. The attachment, of whatever type, should grip the tooth firmly and rigidly. *It is the spring of the lower bar that should be depended on to relieve the abutments of undesirable stress and to raise the saddles off the tissues as soon as the occlusal force is removed.*

For the making of partial crowns encircling the buccal cusp of a lower bicuspid, only the direct method, which can be revamped to one's own technic, if the indirect or the indirect-direct procedure is preferred, will be presented. The abutment tooth is prepared by the use of jo-dandy disks, small tapered burs and stones, Tinker burs and Moore's garnet paper disks. The mesial and distal surfaces are so dressed as to converge slightly, in line with the line of the restoration, and a finishing line is established in the gingival crevice. The buccal cut is so made as to have the necessary bulk of gold without extending higher than necessary toward the occlusal surface and is extended well beneath the free margin. This cut is approximately

Fig. 7.—Bicuspid anatomic forms showing long axes of crowns at angle to axes of roots.

parallel to the axis of the root, rather than to that of the crown. (Figs. 7 and 8.) We are here taking advantage of the anatomic peculiarity of a lower bicuspid in which the long axis of the crown is at an angle to the axis of the root. The lingual cut is made to converge slightly toward the buccal cut. The minimum shoulder consistent with adequate bulk of gold is used. Only enough substance is cut from the occlusal aspect of the lingual cusp to give sufficient bulk of wax for handling, but the sulcus is deepened to give strength to the proximal gold. If the lingual cusp is not to be

encircled, a narrow mesioclusodistal step is made with correct drawing relationship to the buccal cut. (Fig. 9.)

The wax pattern is made with an oiled loosely fitted copper tube or band carefully festooned to the gingival outline. The band is filled with inlay wax and pressed over the tooth. (Fig. 10.) When cool, the surplus wax is trimmed away, the band removed and the wax contoured. Still working on the tooth and with the line of insertion of the denture in mind, a recess for the clasp is roughly formed in the wax. A strip of 28-gage, 22-carat plate gold in the form of a staple is inserted, with one prong

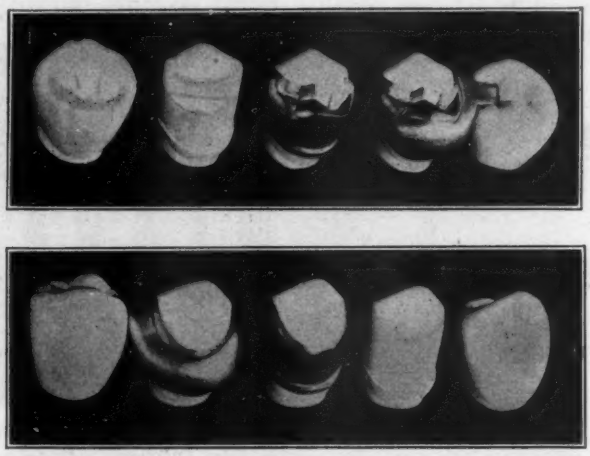

Fig. 8.—Partial crown encircling tooth, but not covering buccal cusp. Above: Lingual view. Below: Buccal view.

in the mesial part and one in the distal part of the pattern, to aid in its removal and to reinforce the wax.

After casting in hard gold, the recess is shaped and polished and the casting is fitted to the tooth. The staple is especially useful in withdrawing the casting from the tooth during fitting. Another help in fitting is to oxidize the gold so that spots of binding will show.

When satisfactorily adjusted to the tooth, the partial crown is transferred to a model of the mouth by means of the impression procedure previously described. This is easier when an abutment restoration is to be transferred to the cast than when a clasp or other complicated attachment is to be transferred. After the transfer is made, a sectional compound impression is taken of the abutment on the model. It is poured in investing material and the clasp or attachment is waxed into the recess on the investment model and is cast.

If a tube attachment is to be used, a more boxlike preparation is made on the attachment side of the abutment tooth. When the wax pattern is formed, a graphite rod from a lead pencil is warmed and inserted in the wax where the tube is to be and is paralleled with the predetermined line of insertion of the denture. Before investing, a small ball of wax is added on the buccal side of the wax pattern, to form a stud or instrument rest for seating the buccal portion of the restoration.

After the prosthesis has been cast, the graphite is reamed out, the hole is tapered and a slot is cut through to the proximal surface with a jo-dandy disk. The surfaces of gold are smoothed and

oiled. Wax is forced into the recess and attached to additional wax, which is shaped into a buccal arm, with as much tang or standard as is desired. The sprue is attached to form the interproximal lug. Then the attachment pattern is invested and cast.

Having the abutment prosthesis mounted on a cast or model makes it easier to wax the tube attachment jointly with a buccal arm, the interproximal lug, the tang and the spur, so that they can be cast as a unit. The upper bar is then made to connect the tangs and the tangs make neat anterior borders for the saddles.

To again analyze the action of the double bar, spring stressbreaker partial

Fig. 9.—Partial crown not encircling lingual cusp.

denture (Fig. 11): When occlusal force is applied on the saddle from any direction, the saddle moves toward the tissue, guided by the lower bar. This movement is in an arc, the center of which lies in the bars anterior to the abutment. Consequently, the more favorable saddle area, that is the area at the heel, receives the bulk of the load, although all of the tissue beneath the saddle assists in supporting the load and receives stimulation. In addition, a stimulating rebound to the saddles and a tendency to return to tissue-rest position have been incorporated. This will have a very salutary effect upon the supporting tissues.

The abutments receive the stress from an area *anterior* to their long axes and, therefore, tend to tip slightly forward rather than backward. They are equal to all of the work that they will be called upon to do as abutments, as the stress has been diminished by the spring and the load is received almost entirely along their long axes; they are buttressed by teeth anterior to them, and they also

Fig. 10.—Wax impression ready for removal of band and with gold staple in position.

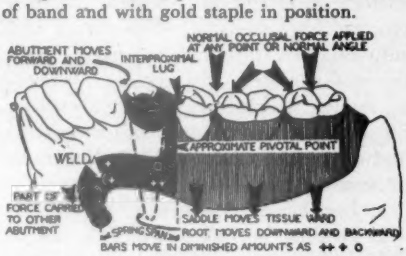
NORMAL OCCLUSAL FORCE APPLIED AT ANY POINT OR NORMAL ANGLE
ABUTMENT MOVES FORWARD AND DOWNWARD
INTERPROXIMAL LUG
APPROXIMATE PIVOTAL POINT
WELD
PART OF FORCE CARRIED TO OTHER ABUTMENT
SADDLE MOVES TISSUE WARD
SPRING SPRUE
ROOT MOVES DOWNWARD AND BACKWARD
BARS MOVE IN DIMINISHED AMOUNTS AS ++ + 0

Fig. 11.—Stressbreaker action analyzed.

support each other by virtue of the splint-like upper bar. This leaves only excessive occlusal stress and malocclusion to be guarded against.

If these devices are correctly made, the operator will not only be surprised, but will also be gratified to see how little resorption takes place beneath saddles, and the patient will have a lower partial denture that meets the specifications outlined at the beginning of the discussion.

USE OF SULFONAMIDES IN ORAL SURGERY

By F. B. Moorehead, M.S., M.D., Chicago, Ill.

THE sulfonamides have seemed almost to demand widespread attention and they certainly have received it. Their true character is not definitely known, neither have we acquired sufficient clinical evidence to accept them for unlimited standard use. There can be little doubt that, as time goes on, the evidence accumulated will be a guide to safe sulfonamide therapeutics. As with many other agents, because of the wide publicity, the public has assumed that the sulfonamides are a panacea and that they may be prescribed without a physician's advice or consent. Urologists state that men with gonorrhea buy sulfathiazole tablets at the drug store and treat themselves. Without in any way restricting the rights of the druggist, it would seem that none of these agents should be sold without a doctor's prescription. Several months ago, we requested forty-five clinics and individuals to state their experience with the sulfonamides. We received twenty-six replies, which have been analyzed by Eli Olech, who found, after careful study, that the answers received can be catalogued as follows:

1. Insufficient experience, 3.
2. Healing improved with the use of sulfanilamide and sulfathiazole, 15.
3. No change in postoperative results, 2.
4. Interference with healing in local application, 2.
5. Improved healing with the use of sulfanilamide, sulfathiazole and sulfadiazine combined, 16.
6. Signal benefits from oral administration, 12.

It is interesting to note the following comments taken from the replies received:

We did not have a great deal of success from a practical standpoint.

Internally, we have found these drugs very satisfactory for both preoperative and postoperative administration. They have proved more useful than when used locally.

I have found that sulfathiazole is far superior to sulfanilamide. The original idea of the cone or tablet in the socket was, to my mind, wrong. Actually, I think it hindered recovery.

I have found that local application of sulfathiazole in the wounds following the removal of submerged teeth not only hastens recovery, but also reduces the amount of postoperative discomfort.

I was one of the first to try sulfanilamide, and I must admit that I was thoroughly disappointed in the results. I am, however, enthusiastic about the results obtained with sulfathiazole.

We used sulfathiazole internally in all infection cases. My results have been more satisfactory with this drug than with sulfanilamide for internal use.

A year ago, we used sulfanilamide cones in the sockets of 250 cases at the clinic. Patients returned every day for six days. There seemed to be a tendency toward oozing and, in some cases, more postoperative pain than expected. Its use was discontinued.

For two years, we have been using sulfathiazole internally for cases of acute infection, alveolar abscess, pericoronal infection and fracture. We are much more enthusiastic than we were about the use of sulfanilamide in sockets.

It seems to me that the field of oral surgery is one of the most important for the use of sulfonamides, both locally and gener-

From the Department of Oral and Plastic Surgery, College of Dentistry, University of Illinois.

ally. I use them in all face injuries, fractures, infections, actinomycosis and the wounds of many operations. I do not think that the use of them takes the place of cleanliness and careful surgical operation or that it will prevent all infection or cause all areas of pus to be absorbed. It has not changed the results of surgical operations to the extent indicated in popular reports.

In cases of impaction, it did not reduce dry socket incidence, but it did hasten healing time.

We routinely place the powder or tablets in all sockets immediately after extracting a tooth. We feel that the healing has been definitely accelerated by this procedure.

We are quite enthusiastic about them, when used locally and orally or when administered systemically. There can be no doubt that many of the open and infected wounds, not only of the mouth and face, but also of the body as a whole, tend to clear up faster when an agent such as sulfanilamide or sulfadiazine is implanted.

With sulfadiazine, the blood level goes up faster and reaches higher levels with about half the amount usually used with the other sulfonamides. The toxic reactions with sulfadiazine are somewhat more frequent than was originally supposed, but they are still less than with any of the others.

Our impression is not particularly favorable to their local use and we frankly feel that, in some cases, there has been an increase in pain and soreness.

I have used the sulfonamide powder in both private and clinical practice and I am not sure that this type of therapy has proved to be particularly useful. Tablets in a tooth socket have remained as foreign bodies, proving to be an irritation. The use of the sulfonamides by mouth and intravenously has proved to be a very important adjunct in control of metastatic cervical infection and general septic conditions.

I have been using sulfonamides in my private practice and at the clinics for the past year. I have been using sulfathiazole and sulfadiazine especially in inflammatory conditions that had developed into a perimaxillary phlegmon.

I have had one case of an acute infection of the jaw running up into the temporal area in which neither sulfathiazole nor sulfadiazine did any good, and it would seem to have this reaction, which apparently is one of the handicaps of the drug. It delayed materially the localization and pus formation.

We tried sulfanilamide in tooth sockets for some time, but it did not prove to be up to reports from others. About six months ago, we started to use sulfathiazole and decided that it was a great help.

We use it in certain mouth infections and in the acute infections. I am convinced that they are valuable agents, but feel they must be used with discretion.

At the present time, we are carrying out some scientific investigations with these drugs. One of the problems is to verify some of the work that has been done on the transient bacteremia that is known to follow some types of surgery, especially exodontia.

It is believed that the use of sulfanilamide in infected and potentially infected wounds was of particular value, as was evidenced by the shortening of the course of infection and the minimizing of the local and general symptoms. Deep infections involving the potential spaces of the face and neck were treated generally by the usually accepted methods, with the addition of the sulfanilamide group of drugs by the oral and intravenous route. About 50 per cent of these infections responded favorably, incision and drainage not being found necessary.

Treatment of superficial abscess by incision and evacuation of the pus and immediate light packing of the cavity with sulfanilamide almost invariably resulted in prompt healing. Obviously, one cannot state with accuracy to what degree the use of sulfanilamide reduces the bone reaction or the promptness with which repair occurs. Yet it is our opinion that its use should be continued in such bone involvements and in the management of potential and definitely infected wounds of the face and oral cavity.

After extraction of impacted wisdom teeth and when chronic abscess conditions are present, we have been filling the sockets with powdered sulfanilamide. Our postoperative reports show that most cases respond satisfactorily to treatment but, in a few cases, we have noted tissue sloughing, and pain was present for several days.

For some time, we have been using chemotherapy in the treatment of acute

infections. The internal administration of this drug is invariably placed in the hands of the internist. We have been using sulfanilamide topically both in powder and tablet form in wounds. This method of treatment, particularly with the tablets, has proved most successful in our hands.

I have been using sulfanilamide after every oral operation. From a clinical standpoint, it appears to have value when used locally.

I have been instilling the powdered sulfanilamide into nearly all extraction wounds. We believe that definite benefit is derived from the proper use of the sulfonamides in mouth surgery.

Attention here is called to an article by Frederick Griess in the *Nebraska Scholar,* a review of current research and scholarship at the University of Nebraska in Lincoln.

Unfortunately, many of the men seem to misunderstand the word sulfonamide. They fail to appreciate that it is an inclusive term covering sulfanilamide, sulfathiazole, sulfapyridine, sulfadiazine, etc. A cross-section of the replies would indicate that the majority were impressed with the usefulness of the sulfonamides, with a leaning toward sulfathiazole in preference to sulfanilamide. A few advocated the intravenous use of these agents, which we consider somewhat questionable. It is my frank opinion that the intravenous use of any agent should be in the hands of a qualified internist. The dentist is not trained and cannot be expected to use intravenous medication properly. There are men who are competent, but the great majority should probably be considered incompetent in the premises. It is interesting to note too that the majority are solidly against the use of tablets or cones locally.

Clinical research is difficult for the reason that unless patients are hospitalized, they are not brought under adequate control. Then too, there is such a variability in patients that the highest degree of judgment is required in making not only a proper analysis but also adequate allowances. In the laboratory investigation, the mathematical rule may be used constantly, but it is of little value in clinical investigation.

We have no doubt that the twenty-six replies represent a good grade of judgment and conscientious care, both of which add to their value. Their agreement is both interesting and illuminating, and indicating a verdict that must be looked upon as valuable. We are grateful to every one who gave such prompt and efficient help.

An interesting editorial in the *Journal of the American Medical Association* of July 4, 1942, on "Intraperitoneal Administration of Sulfanilamide," says:

> In the experience of Hudson and Smith, intravenous and intramuscular chemotherapy gave disappointing results in many cases of spreading peritonitis, the fatality rate reaching the figure of 55.5 per cent. Since the adoption of the intraperitoneal sulfanilamide therapy as a routine procedure in similar cases, the mortality has been reduced to 8.3 per cent. Jaundice was not observed in their series of 125 cases. The consensus is clearly that intraperitoneal sulfanilamide is an extremely valuable weapon in the treatment of potential or established peritonitis.

The articles included in the bibliography and numerous other articles indicate that great care should be exercised in sulfonamide medication. They also indicate a danger zone, which every one should take into consideration.

Several months ago, we began a series of studies on the use of the sulfonamides in minor oral surgery. In this study, we emphasized particularly the extraction of teeth, both normal and special, removal of root-end cysts, root resections, etc. Our first and principal difficulty was the failure of patients to return for observation; and unless they have definite pain, they will not return. At least two-thirds of them did not return at all. Even when sutures are placed in the gum tissue, some of them fail to return to have the sutures removed. In a small series of 275 patients, 123 returned at least once

for observation and in these cases the following facts were noted:

Sulfanilamide: 49 patients responded favorably; three developed infection.

Sulfathiazole: 63 patients responded favorably; four developed infection.

In those who "responded favorably" there seemed to be some benefit from the use of either sulfathiazole or sulfanilamide after tooth removal. These studies will be continued for at least 1,000 cases, which we feel will give valuable information.

Observing the therapeutic procedures in the clinic, in the hospital and in private practice, we are strongly of the opinion that the topical application of no drug known at the present time is of any great value after the removal of teeth. The use of sulfathiazole seems to modify the postoperative discomfort in some cases. The postoperative variabilities with or without the sulfonamides are about the same. When any one of the agents is used, we are convinced that the powdered form only should be applied, and that it should be placed in the socket after the sutures have been made so that they can be tied immediately, holding all of the agent possible in the tissues. These agents are much more useful where there is definite infection. In the clean cases, we doubt whether they are of any material value. The administration by mouth, on the other hand, is of distinct value. They are particularly useful in pericoronal infections of submerged or partially erupted teeth. In this instance, the use of sulfathiazole by mouth coupled with careful irrigation once or twice a day will assure very good results in a few days. In extensive infections, there can be little question that sulfathiazole, sulfanilamide or sulfadiazine exerts a definite influence when administered orally.

The selection of the particular sulfonamide will depend on, first, the discretion of the doctor and, second, the determination, when possible, of the type of infection. In extreme cases of cellulitis, this, of course, is hardly possible, and one will need to be guided by the clinical findings and by his own judgment.

In the matter of dosage, we believe that no more than 10 grains should be administered at a time. One may start with 10 grains every four hours, continuing until four doses have been given, and then reduce the dosage to 7 or 5 grains. In all cases, it is important to reduce medication as soon as the symptoms have been definitely modified. As one looks at the various reports, one is impressed with the fact that large doses have been definitely responsible for bad results. By using small doses, one will detect early any untoward symptoms and withdraw the drug. The accumulative effects, any idiosyncrasy and also an acquired sensitivity, as noted in Dr. Nelson's paper, are easily regulated through small doses. We make this statement in the face of the fact that some very good clinicians use large doses. We do not believe that any time will be lost or any harm be done by early moderate dosage. After the reaction has been determined, the dose can be increased to meet the clinical conditions in a given case. In this we believe that the therapeutic test will be met without danger.

This discussion points with a definite specificity to the following: The sulfonamides are useful agents, but must be used with discretion. In the field of oral surgery, the average man will use these agents topically and by mouth, and will studiously guard his patient against any therapeutic misadventure. The matter of dosage should be under rigid control, with a smaller sized dose used initially. Many men do not use more than 10 grains every four hours, increasing the dosage in rare cases in which the symptoms seem to demand it. The intravenous method should not be used except by the qualified internist. Intravenous medication always carries with it a risk,

and because of the wide variability of the reaction to these agents, this form of medication should be restricted to the exceptional case. The occasions when intravenous administration may be indicated are very limited. We have a strong feeling that a topical application, except in the case of definite infection, is of little value. In some rare cases, it may be helpful, but as a rule its general use is not indicated. The agent should be in contact with the tissues longer than it is possible to maintain it, and furthermore its use should not lessen the attention to surgical care and surgical precision. Blind faith in any sulfonamide should not be a substitute for careful surgery.

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SOME PRINCIPLES OF MODERN FIXED BRIDGE CONSTRUCTION

By A. A. BARTLETT, D.D.S., Detroit, Mich.

MOST of us agree that tooth structure lost through caries or accident should be replaced. Likewise most of us accept as axiomatic that any tooth of the arch, from second molar to second molar, that is missing should be artificially supplied. The manner of this substitution falls into two distinct classes: fixed and removable bridgework.

The purpose of this paper is to establish some basic principles that will aid the careful operator in designing fixed bridges.

Read before the Section on Partial Denture Prosthesis at the Eighty-Third Annual Meeting of the American Dental Association, Houston, Texas, October 28, 1941.

Jour. A.D.A., Vol. 29, December 1, 1942

It is possible today to construct a fixed bridge that is an aid to health and function of any mouth. With this thought, it is time to look back and consider why many fixed bridges fail to meet expectations. But this is not enough: We must offer a cure for these causes of failure.

To construct a durable fixed bridge is only one of our objectives: To restore function and protect all of the remaining teeth and investing tissues is far more important. One might ask, "What is the most serious type of fixed bridge failure?" I would answer, "One that results in the loss of more teeth."

The words "judgment" and "design" will cover just about all of the the reasons for failure in fixed bridge construction.

However, these words become very much involved. At the outset, we are confronted with the problem of root anchorage versus occlusal stress. The fact that a patient needs a space restored to function usually means that other corrections are also necessary. Owing to drifting into the space or even to normal wear, the occlusion will show cuspal interference, and this should be corrected before restoration is started. Needless to say, the operator must possess at this point a complete set of dental roentgenograms and good study models. Thus fortified, he can proceed with certainty on a course of occlusal adjustment and the designing of the case in hand.

With occlusal interference minimized, the operator may now consider the important problem of the restoration. By

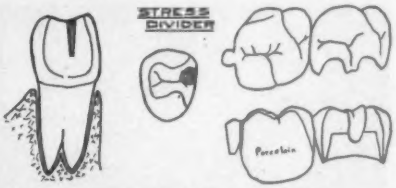

Fig. 1.—Typical maxillary first molar restoration. The main support (second molar) carries a three-quarter type of attachment, while the stress holder is lodged in a class 5 inlay on the second bicuspid.

studying tooth function, we may determine what added load a given normal tooth is capable of assuming.

STUDY OF TOOTH FUNCTION

From a functional aspect, there are four distinct groups of teeth; namely, the incisors, cuspids, bicuspids and molars. To clarify this classification, let us consider each one of these groups in detail, as shown in the accompanying table.

1. The incisors are used for biting or incising. With the coming of civilization, the use of the incisors for prehension has been virtually lost. Therefore, the incisors are usually subject to stress only in the direction of their long axis.

2. A tougher morsel of food is carried to the cuspids, where the action is that of tearing. Hence, the term, "canine tooth." The cuspid is subject not only to a vertical thrust, but also to a buccal thrust in the maxillary arch and a lingual thrust in the mandibular arch. This tooth is firmly rooted in bone, and even where there is much lingual abrasion of the maxillary cuspid, there is seldom destruction of the supporting tissues.

3. With the piece of food within the oral cavity, the next act is breaking it up. This is done in the bicuspid region with a mandibular action chiefly vertical to the plane of occlusion, but also buccal and lingual, which we call lateral thrust.

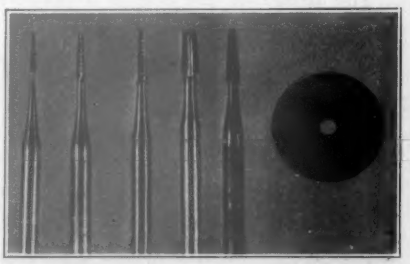

Fig. 2.—Instruments used in preparation of slot. Left to right: Tapered fissure bars Nos. 700, 701 and 702; tapered finishing bars Nos. 601 and 602; fine cuttle disk.

One should note here, however, that the roots of the bicuspids are ill fitted to stand lateral thrust unless supported by the cuspidation of the teeth in the molar region.

4. Final comminution of the bolus of food is left for the molars, and here the mandibular action is in every direction. With the possible exception of certain third molars, the roots of these teeth are well designed to withstand such stress.

Within each of these groups and in different individuals, the various root and crown forms denote a marked difference in function of the individual tooth.

These facts lead to the belief that all teeth have somewhat different movements during mastication and consequently should not be rigidly tied together in a fixed bridge, and that, therefore, a slightly movable rest should be employed at one end. This two-piece bridge not only favors individual tooth movement (or function), but actually permits the use of lighter attachments because the abutment teeth do not "fight" each other when stress is applied. In this instance, the term "stress-breaker" can properly be given to the unsoldered end of the bridge. However, if properly designed, the rest may become what is more important, a "stress divider."

The design of the rest is important. (Fig. 1.) The type of fixed bridge commonly known as "loose end" or "stress-breaker" allows too much latitude in this important detail. The rest which I am about to describe is a vertical finger, usually about the size of a No. 701 tapered fissure bur. It may be larger or smaller as the case indicates. The seat or slot portion of the rest is prepared in the attachment of the weaker-rooted tooth and on the side approximating the space to be supplied. The finger is made as long cervically as this attachment will permit. Its direction must be parallel to the area of preparation in the other tooth, and should deliver stress in the direction of the long axis of the weaker-rooted tooth. In short-crowned teeth, one must obtain the longest possible slot. However, in teeth with very long crowns, the slot does not need to be so long as is possible.

The diameter of the slot is determined to some extent by the depth of the proximal preparation in the tooth. If the crown of this tooth is small, the diameter of a No. 701 bur will be adequate, and the tooth should be prepared accordingly. It is never necessary to alter the contour of an inlay for the purpose of receiving this slot. A No. 702 tapered fissure bur will be large enough for the preparation of any case.

The slot should be as near the normal contact point of the tooth buccolingually as is possible.

The instruments used in preparing this slot are tapered fissure burs 700, 701, 702; tapered finishing burs 601, 602, and fine cuttle disks. (Fig. 2.)

Fig. 3.—Inlays mounted on stone or low-fusing metal model as made from plaster impression.

Fig. 4.—Inlay of main support removed in order to determine line of draw.

With the attachments on a metal working model, the slot is prepared as follows. (Fig. 3.) On the marginal ridge of the attachment which is to bear the rest, a slight notch is made at the proposed contact point, denoting the buccolingual position of the slot. The other attachment is withdrawn from the working model, and the line of withdrawal noted. With a sharp instrument, the proximal surface of the first attachment is scratched from the notch in the marginal ridge toward the cervix (Fig. 4), with care to follow the line of draw just noted

in the other attachment. This gives the vertical direction of the slot which should be in the long axis of the weaker-rooted tooth. The marked attachment is removed and placed on the die. (Fig. 6.) A No. 701 tapered fissure bur is dipped, and the slot thus produced is approached from the occlusal aspect and cut to its base. This produces a dovetailed slot with a flat floor. (Fig. 1.) The slot should be enlarged if the case permits. The internal surfaces of the slot are polished with finishing burs and the proximal part is polished with fine cuttle disks. The attachment is replaced on the working model and the parallelism in the mesiodistal direction is checked. (Fig. 7.) In indirect working, the slot may be almost completed in the wax pattern.

Fig. 5.—Making slot in bicuspid inlay.

This will show how deep the slot can be made with safety. The male portion of the rest is waxed as an integral part of the pontic and cast as part of it. (Fig. 7.)

This procedure requires less time than is necessary to describe it and the rest thereby constructed fulfils four important obligations. (Fig. 1.)

1. Since it has a flat base fitting closely against its seat, the two abutment teeth carry about the same vertical stress. Clinically, we know that most teeth can tolerate an increased load in this direction.

2. Lateral stress is applied as near the cervical portion of the weaker-rooted tooth as possible. This is accomplished just before the bridge is set. The occlusal three-quarters of the rest is disked slightly, only the cervical tip being left in contact with the box walls. This reduces the buccolingual leverage during mastication and tends to make the abutments more nearly equal in load-bearing qualities.

3. The abutment teeth are locked against drifting apart or rotating out of position.

4. The construction of the rest is simple and requires no special instruments.

The opposite end of the pontic is soldered rigidly to the abutment piece. To facilitate description, let us call this the "main support."

Fig. 6.—Slot in bicuspid inlay. This should be parallel to the prepared area on the main support.

The two-piece type of construction may be called a convenience measure in that each of the attachments can be set as an individual inlay or crown. The result is that attachment borders are better finished and slight discrepancies in assembly are minimized. The latter feature virtually eliminates the possibility of torque on one or both abutment teeth, so often encountered when they are rigidly soldered together. In case of abnormal tipping of the teeth, one of our greatest difficulties is reduced in that attachments do not have to be made

parallel to each other. Only the rest need be parallel to the main support. (Fig. 8.)

Since the teeth directly adjacent to the space to be bridged are usually the only available abutments, we must decide which of these is to be the main support. That tooth should be capable of withstanding all of the force applied to the pontic during mastication, as seen in the study of tooth function. Usually, this will be the tooth with the most favorable root anchorage; in most cases, the posterior one.

A notable exception may be the case of a mesially or distally tipped tooth. Here, the tipped tooth is always the main

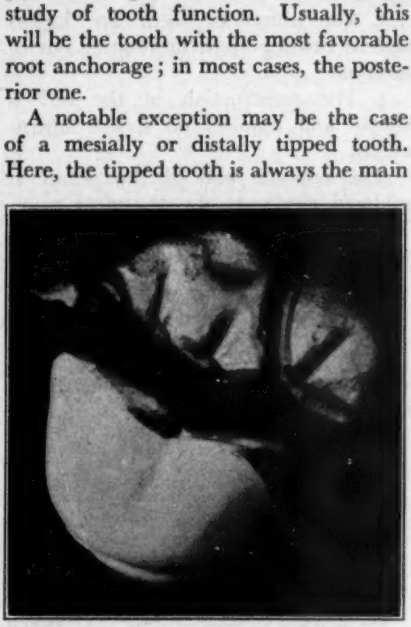

Fig. 7.—Finished casting on porcelain pontic.

support, while the one vertical to the plane of occlusion receives the rest. However, we usually find that the tipped tooth is the posterior one, and the general rule still applies.

SOME SPECIFIC CASES

The manner of supplying a missing second molar is dependent on several conditions. The third molar, if tipped mesially, as it usually is, and firmly rooted, should be chosen as the main support. In most cases, the attachment should be a full crown. However, if the third molar is in normal vertical position, and particularly if the root is conical, it would be better to use it only to aid the first molar in supporting the pontic. In this case, a simple proximal inlay in the third molar will receive the rest.

This discussion brings up the question of promiscuous extraction of all third molars. Where early loss of the first or second molar is anticipated, every effort should be made to retain the third. Many times, the retention of third molars has obviated the wearing of tissue-borne partial or full dentures later in life. One of the principal factors in the retention of third molars until the time when they become useful is the maintenance of normal function. This obviously involves the retention of the occluding tooth in the opposite arch. Because of the inaccessible position of these teeth,

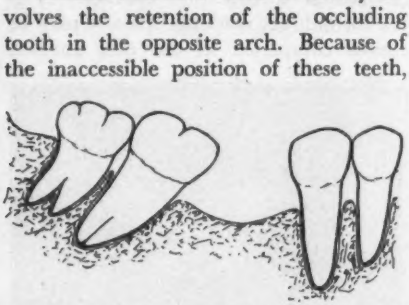

Fig. 8.—Typical condition of tipped lower molars.

special prophylactic attention and personal brushing methods must be introduced at an early date. Frequently, these teeth begin their eruption in a caries-ridden mouth. During the gum-flap stage, the liberal application of silver nitrate to pits and fissures is indicated. Where actual cavities appear, the use of copper amalgam fillings will be found to inhibit recurrent caries. With these thoughts, let us apply a little wisdom to the patient's wisdom tooth problems.

As we go forward in the arch, when supplying a missing first molar, the second molar is always used as the main support. Occasionally, we may be tempted to solder to the attachment on the second bicuspid, but analysis will show us the fallacy of such a procedure.

Functionally, the bicuspid is in a different group. Moreover, it is against biologic principles to conceive of the roots of a bicuspid as doing the work of the trirooted bulwark of the arch, the first molar. On the other hand, the second molar, being in the same functional group, comes much closer to meeting this requirement. Furthermore, the latter is frequently the tipped tooth, while the bicuspid remains perpendicular to the plane of occlusion.

The maxillary second bicuspid may frequently be replaced as the main support by the first bicuspid. Here, teeth of similar function support each other, and extensive cutting of the first molar is avoided. However, it is better to solder to the first molar if it requires a large inlay. This permits a simple distoclusal inlay in the first bicuspid. The latter has a concavity on the mesial surface, which makes the construction of a mesiodistal inlay extremely difficult if one is to avoid the display of gold. We assume that the mesioclusodistal type inlay will be necessary when this tooth is used as a main support.

Mandibular second bicuspids should usually be attached to the molar because of the weak root of the lower first bicuspid.

In supplying the first bicuspid in either arch, the second bicuspid is in every respect the first choice as a main support. The bicuspids are alike in function and the cuspid is allowed most of its rotary motion. Moreover, the environment of the maxillary cuspid has given it no lingual thrust. Therefore, this stress should be borne mostly by the bicuspid.

In mandibular first bicuspid replacements, the same principle applies, the thrust being reversed. In this case, the lingual surface of the cuspid can be built up to receive the rest.

It may be well to mention here the importance of conservative cutting of the cuspids. These, being the cornerstones of the arch, should be preserved, as a last resort, for old age.

When the cuspid is missing, the problem becomes much more complicated from the aspects of both esthetics and retention. Certainly the bicuspid should be chosen as the main support. The lateral incisor must then receive a rest which delivers stress parallel to its long axis. This must be placed in a small distal inlay on the lingual surface of the lateral incisor and never on the natural tooth. Placing of the rests on the natural tooth surface not only causes undue stress with rotation of the lateral incisor, but invariably results in caries under the rest.

When the lateral incisor is particularly weak or, for other reasons, we do not wish to place a rest upon it, we may occasionally use both bicuspids for attachments. This should be done only in selected cases and with careful design. A small well-finished solder joint must be placed only at the contact point, with a good embrasure remaining. This contact area of the attachments can be kept small and yet afford adequate strength if a small piece of stiff wire is incorporated in the solder joint.

A missing lateral incisor can almost invariably be suspended from the cuspid. Having observed several hundred of these replacements, I believe that, in most cases, a rest on the central incisor is unnecessary. It seems that the occlusion, coming as it usually does on the distal portion of the cuspid, will balance the

ROOT ANCHORAGE PRINCIPLE OF FIXED BRIDGE CONSTRUCTION

Tooth Groups	Stress Received During Mastication
Incisors	Vertical (parallel to long axis)
Cuspids	Vertical plus buccal or lingual
Bicuspids	Vertical
	Lateral (buccolingual)
Molars	Vertical
	Lateral (universal)
	Mesiodistal

torque delivered by the suspended pontic and so prevent drifting.

Replacement of one central incisor usually involves the use of two attachments, in order to prevent drifting. Naturally, the other central incisor will be the main support, while a small inlay in the lateral incisor receives a very small rest. Again, this slot must be so prepared that stress will be delivered in the direction of the long axis of the lateral incisor. Seldom are we permitted to suspend this tooth without a rest. However, when the space is too large for the tooth indicated, we may be forced to use only the other central incisor as an attachment. This is also true when the remaining central incisor is pulpless. The use of pulpless teeth for bridge attachments evokes a rather general rule. Since the general health of the patient may at any time call for the removal of all possible foci of infection, extraction of pulpless teeth may be indicated. It will be well, then, if the first replacement has not injured sound vital teeth. It naturally follows that all major preparation should be made on pulpless teeth, leaving the sound ones as nearly untouched as possible.

These one tooth replacements, when properly executed, are undoubtedly one of the finest services that we may render. Function and health of the mouth are restored and the patient is comfortable. Thus, the things we strive for are accomplished.

When the edentulous space is more than a one tooth space, the fixed bridge field is greatly narrowed. Root anchorage is the controlling factor. There was a time when members of the profession gathered at national meetings to tell of the fourteen-tooth fixed bridges which they had constructed. Nowadays, if we construct a bridge of more than two teeth, we avoid mentioning it to our colleagues who, we hope, do not do such things.

However, many of these longer spans can best be restored with fixed bridges. Certainly the replacement of two bicuspids falls in this category. Here, we are using the best abutment tooth of both anterior and posterior regions. Needless to say, the first molar should be the main support. The question naturally arises "Will the weight of such a bridge in the maxillary arch cause the rest to drop slightly out of its seat?" I have observed many of these bridges which have been twelve years in service. Without exception, the rest seems to be as firm in its seat as it was originally.

Another two-tooth replacement is that of the first molar and second bicuspid. In the maxillary arch, these pontics may be attached to a firm second molar with a rest in the bicuspid attachment. On the other hand, in the mandibular arch, the first bicuspid has a notably weak root. Therefore, this replacement may be a removable type where the cuspid or other teeth can be called on to aid in absorbing the stress of mastication.

A two molar bridge in either arch is almost invariably more lasting when removable. Usually, a remote point across the arch should be used to stabilize the abutment teeth.

These are the principles of root anchorage. Nature has given us considerable leeway in the additional load that teeth will assume in the restoration of lost units. If we will but follow her basic laws in planning our restorations, the results of our daily work can be a pleasure to behold.

PRINCIPLES OF RETAINING FIXED BRIDGES

It might not be amiss to mention some basic principles of the retention of fixed bridge attachments. When dealing with vital abutments, the attachment either grips the tooth, is gripped by the tooth or is retained by a combination of these two forces.

Obviously, a full gold crown is the outstanding example of an attachment gripping the tooth. On the other hand, it is

almost impossible to conceive of a pure case of a tooth gripping the attachment. A simple occlusal inlay would answer, but would violate the rules of cavity preparation. To rectify this non-conformity, we must add a proximal step. Then immediately the attachment grips a part of the tooth. This line of thought has a definite practical value in cavity preparation. When we select the more simple types of cavity preparation, we must consider the strength of that part of the tooth which the attachment grips. Will the torque caused by mastication on the pontic fracture a cusp, or even split the tooth? Extension of the mesial or distal slices at a different angle will aid in gripping and supporting the abutment tooth. The slice-lock preparation adjacent to the pontic will prevent lifting at the cervical border of the attachment. These concepts will cause us to give consideration to the use of mesioclusodistal inlays, three-quarter crowns and full crowns as bridge attachments.

The internal shape of the attachment further determines its resistance to displacement. A full crown with certain internal characteristics has far more resistance to displacement than one which is perfectly smooth. We should endeavor to visualize the stresses which will be delivered to the attachment and make walls to absorb them; that is, buccal and lingual walls in the cavity preparation that will resist buccolingual thrusts on the pontic.

A fine example of combining attachment grip with tooth grip is seen in the pinledge attachment. Each individual pin is retained by the tooth structure, while two or more pins in combination grip the tooth like claws.

If the operator will study the use of pins, his problems of fixed bridge retention will be greatly reduced. In the posterior part of the mouth, the judicious addition of pins to any attachment of questionable displacement qualities will give unlimited retention. Pins may be placed in these castings at any point where the pulp chamber permits. I strongly advocate the sectioning of teeth in various directions in order to study the shape of pulp chambers.

In the case of anterior teeth, the well-designed pinledge attachment will be retained in spite of any displacement force that the root of that tooth can tolerate.

Probably nothing is more embarrassing to the dentist than to have fixed bridges come out. I advocate leaning toward overretention rather than too little retention of fixed bridges.

SUMMARY OF ROOT ANCHORAGE AND CROWN RETENTION PRINCIPLES

A. *The Root Anchorage Principle.*—1. With rare exceptions, fixed replacements not more than two teeth in length are advocated.

2. With the exception of a few anterior replacements, the two unit type of construction should be employed.

3. With modifications to suit the individual case, the type of stress divider described herein will be found to be most practical.

B. *The Crown Retention Principle.*—1. More than adequate retention is advised in the "main support" attachment; e.g., the mesioclusodistal inlay and its modifications, the three-quarter crown and the full crown.

2. Lighter attachments are advocated for the tooth which bears the rest.

3. Pinledge attachments are to be used for anterior abutments.

Finally, let us accept our responsibility in this field of dentistry, recognizing our own failures as well as those of others. My plea is that we make a study of design, applying the basic laws of crown retention and root anchorage.

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THE USE OF THE ROENTGENOGRAM IN OPERATIVE DENTISTRY

By L. R. Main, D.D.S., St. Louis, Mo.

ROENTGENOGRAPHIC information is accepted by every department of dentistry as a guide in practice. All interested in health service of any kind likewise subscribe to the intelligent use of the roentgen rays as a means of securing dependable information. In no department of dentistry is roentgenographic information more valuable as a guide than in operative work. Endeavoring to maintain a modern office without this valuable information to assist in diagnosis is like turning back the hand of scientific progress for a quarter of a century. It means groping in the dark unnecessarily in failing to turn on a light that gives information of a unique character and enables one to be more rational in operative effort. True it is that most practitioners use roentgenographic information, but it is also true that some may not realize the true value of this adjunct in operative procedures. A few practical suggestions, with illustrations, will indicate the necessity of painstaking care in radiodontia, if service in operative dentistry is to be adequate.

Before much dependable information can be secured through the use of the x-rays, we must have a fairly accurate conception of technic, so that dependable results can be assured in the finished film. Three shortcomings have been observed in roentgenograms sent into the office for interpretation. One is that not enough exposures have been made of a questionable tooth or area. Secondly, there is a tendency to foreshorten the image on the film; and, thirdly, the film may be so dense that detailed information is not afforded. Any one of these conditions, or all three conditions in the same film, makes it impossible to realize the potential value of the roentgen rays as an aid to diagnosis. The necessity of exercising care in making and processing a film cannot be urged too strongly. Many are of the opinion that any one can make an exposure of a dental film, but that it requires an expert to read the film, or to interpret the findings.

I appreciate as fully as any one the advantages of expert opinion where the roentgenogram is concerned. On correct interpretation depends a thorough knowledge of the normal structures and only with this knowledge is it possible to recognize the abnormal. But why so much greater knowledge and care are necessary for interpretation than for making the exposures it is difficult to understand. I do not mean to minimize the importance of interpretation in order to secure reasonably accurate information from the film. We can only interpret in the film what has actually been put into the film by the exposure. The information must be put there by the correct exposure and processing before we can hope to discover it in the film. By correct exposure, I mean all the phases of radiodontia necessary to obtain a good roentgenogram. I am not disclosing any secret when I say that the average film is too limited in the information that it contains, because of faulty technic.

Read before the Section on Operative Dentistry, Materia Medica and Therapeutics at the Eighty-Third Annual Meeting of the American Dental Association, Houston, Texas, October 29, 1941.

It is of interest to note the developmental stages through which the x-rays have passed, from offering the grossest sort of information down to the present day, when the film is expected to furnish the minutest detail at all times. Well within the memory of some of us, marked changes have come from their use in diagnosing a fracture of the mandible, failure of a tooth to erupt or some gross pathologic condition, all of which were projected upon large extra-oral plates, down to the present time when the number of pulp canals in roots and the presence of calcareous deposits below the gum margins and of pulp nodules can be determined and the malposed teeth or foreign objects be accurately located.

We cannot dwell on all the applications of the x-rays in operative dentistry, nor is it necessary. There are a number of conditions revealed which must be considered if we are to render a reasonably high standard of service. Dr. Raper states that more than sixty definite conditions revealed in the roentgenogram cannot be disclosed by other methods of examination, but I shall confine myself to a few conditions that are of practical value in operative dentistry. As operative dentistry has to do primarily with the conservation of the natural teeth, the enemies that destroy, or tend to destroy, the natural teeth must be considered in the discussion.

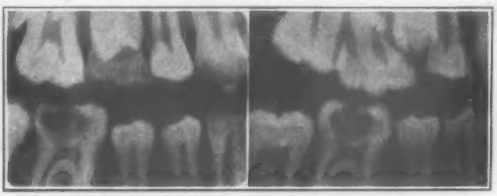
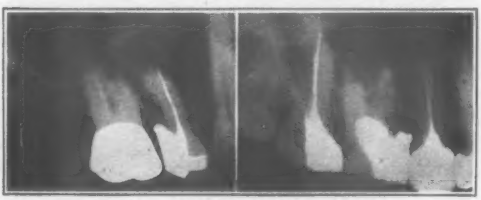
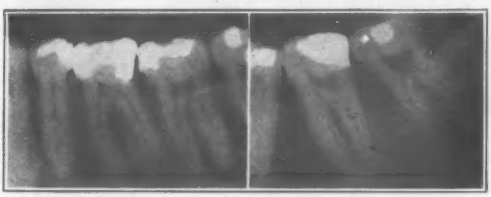


Fig. 1.—Evidence of caries and malposed bicuspids.



A



B

Fig. 2.—A, irregular margins of amalgam fillings. B, crevices at cervical margins of fillings on distal aspect of first molars.

The ideal toward which medicine is

always striving is the elimination of itself through the process of prevention. To prevent an epidemic is a greater service to a community than to cure or stop a condition. For instance, the destroying of the mosquito that was responsible for yellow fever was of great benefit to humanity, but it worked toward elimination of the need for the oncoming physician. And so it is in our own field. A great effort is being made to eliminate dental caries, and if dental caries can be eliminated, many of our dental problems will be solved. Although we cannot prevent caries with the x-rays, we can discover its presence early enough to prevent pulp involvement if the roentgenogram is used intelligently. This fact alone justifies the use of the roentgen rays as the greatest forward step in preventive dentistry.

The prevalence of caries in the adolescent is recognized by all. (Fig. 1.) We remember that period before the child reaches the twentieth year and in which decay gets in its damaging work. It would be good dentistry, and a step toward preventive medicine, if bitewing examinations of boys and girls were made at intervals sufficiently frequent to preserve pulp vitality.

I realize that these examinations will not be made until parents appreciate the necessity of cooperation with their dentists to minimize the results of extensive caries in children's teeth.

I have stressed the early recognition of caries because it is the chief enemy of the teeth, and it is the ravages of decay that makes most reparative work necessary. The restoration by artificial means

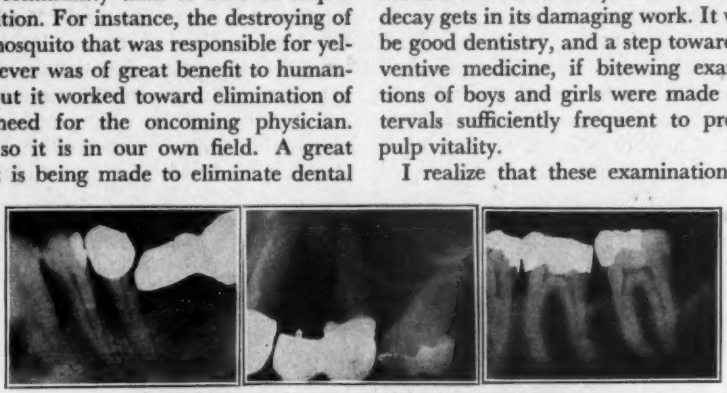


Fig. 3.—Poor contacts with loss of structures.

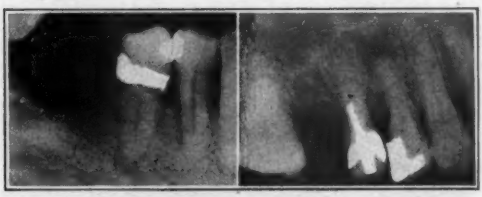
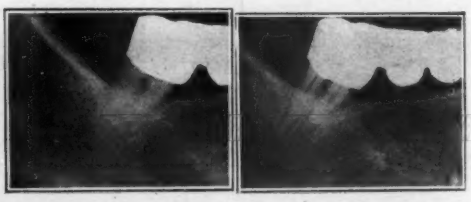


Fig. 4.—Fillings too close to pulps.



A B

Fig. 5.—A, deposit on distal aspect. B, deposit removed; showing loss of process.

of that which has been destroyed by decay is one of our greatest problems, a problem that has been emphasized in recent years. Extreme care is necessary in these restorations or the operation will fall far short of the ideal. One of the frequent findings in the roentgenogram when a restoration has been made, especially if amalgam has been used, is an overhanging margin or margins extending into the soft tissues. (Fig. 2.) These ledges usually cause irritation, inflammation and sluffing away of the alveolar process, breaking of the contact point and separation of the teeth, and are sometimes the cause of pyorrhea. After an extensive restoration, a check-up with the roentgenogram will prevent such a condition from doing permanent harm.

The x-rays are used to determine the presence of ill-fitting crowns and gold inlays that are contributing to the same disastrous end. (Fig. 3.) Periodontoclasia is a word that was used a good deal a few years ago, but it has not been employed so much since its application has come to be restricted to its real meaning. Extending margins with broken contacts are a likely cause of periodontoclasia and are sometimes factors in pyorrhea. A perfect-fitting interproximal inlay is unsuccessful if it fails to restore the contact point.

I should like to sound a warning while speaking of restorations, to the effect that there is a limit to the amount of metallic filling material which can be placed with safety within a vital tooth. In this day, when devitalization is not carried out so readily as it was a few years ago, we are attempting the impossible by placing metallic substances in close proximity to the pulp. Sometimes, the death of the pulp from irritation is a slow process, extending over a period of months, and many cases of slow indefinite neuralgia are traced to this condition, and some of these teeth become septic. (Fig. 4.)

In no condition is the result of pathologic processes more accurately projected by the roentgen-rays than in cases of marginal loss of the alveolar process. There are several causes for this destruction, and roentgenographic information is invaluable in determining the etiology. Since the loss of teeth through marginal destruction of the supporting tissues is one of our greatest problems, too much stress cannot be placed upon the importance of using any means to determine the causes of such destruction at the earliest possible moment. (Fig. 5.)

Fig. 6.—Good mechanical dental work with bad foundations.

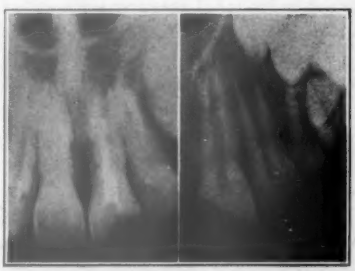


Fig. 7.—Position of pulps.

The loss of these structures means a poor foundation for operative effort. Though restored ever so accurately, the superstructures cannot be serviceable longer than the foundation can withstand the stress of mastication. Information

along these lines is indispensable from the standpoint of health and service. (Fig. 6.)

Where restorations are to be made, an accurate positioning or location of the pulps in such teeth is advisable before reconstruction is attempted. (Fig. 7.)

The roentgenogram has made possible a higher type of dental service, from the standpoint of technical procedure as well as in the elimination of septic conditions. It has also added materially to our responsibility, since the roentgenographic check-up may disclose our failures. However, the roentgen-rays have contributed immeasurably to the field of operative dentistry and are a factor in a healthful service.

615 Metropolitan Building

APICOECTOMY PRIOR TO PULP CANAL FILLING

By DANIEL M. KOLLEN, Ph.G., D.D.S., New York, N. Y., and MILTON SCHWARTZ, B.S., D.D.S., Brooklyn, N. Y.

FOR mouth rehabilitation in defense dentistry wherein anterior teeth are involved, with extensive periapical bone destruction as a result of pulp disease, there is a choice between removal of the tooth (and replacement) or protracted pulp-canal therapy with eventual apicoectomy. Traditionally, amputation of infected root apices is performed after the pulp canals are filled. In such sequence, considerable difficulty is often experienced in maintaining a dry, sterile canal for the reception of a condensed pulp-canal filling. Reversing the procedure by performing the periapical operation first, stopping the flow of periapical fluids into the pulp canal by means of a gauze plug and then filling the canal itself, all in one visit, affords a high degree of surgical cleanliness within the canal and also is a distinct time saver.

At the Mount Sinai Hospital Dental Clinic, where the cases that form the basis for this report are treated, the patients more often have anterior teeth with pulp disease advanced to a chronic, suppurating stage; a stage of long standing infection with marked periapical bone pathosis. It was necessary to develop a technic that would be economical of time as it would be efficient in repair. To attain such ends, a comparison of technics was instituted upon the following basis: (1) treatment by medication and mechanical means, using bacteriologic cultures as a means of determining the time for filling; (2) pulp canal filling followed by apicoectomy, and (3) apicoectomy prior to pulp canal filling. This report will be concerned with the clinical aspects of the third method, since objective data and clinical observations indicate that it is as time-saving as it is reliable.

DIAGNOSIS

It is within the scope of dental diagnosis to evaluate the significance of both local and general elements, and to synthesize these into one comprehensive whole. What is the extent of the local pathologic condition? Are the adjacent teeth involved? What are the reparative powers of the involved tissue? In this connection, youth, with its reparative ability at a maximum, is a favorable influence. What systemic disease, if any, is present? These are questions that

From the Dental Service of Mt. Sinai Hospital, New York.

must be answered, and it is from the balancing of these elements that emanates the policy of procedure to which is ascribed the term "diagnosis." It implies consideration of the general and local factors to the end that the final decision shall be based on an evaluation of the constitutional as well as oral aspects of the particular individual.

Observation, history taking or questioning, instrumentation, roentgenographic examination, percussion, pulp testing, transillumination and inquiry into the specific nature of the pain are essential for local diagnosis. In employing these methods, consideration is given to (1) mouth hygiene, (2) number of missing teeth, (3) condition of adjacent teeth, (4) prosthetic problems, (5) accessibility for pulp-canal therapy, (6) previous pulp therapy attempts and failures and (7) the cooperation of the patient for lengthy sessions.

Since so much has appeared in recent dental literature on the importance of systemic factors, it is merely being mentioned in this paper. It is desirable to work on a healthy person, especially with therapeutic measures of this type, where so much depends on the power of the tissue regeneration and the phagocytic ability of the body. Suffice it to say that, before treatment, the physical state should be thoroughly understood and systemic disorders be known.

OPERATIVE PROCEDURES

The case considered suitable for treatment is one commonly seen. The tooth is one that has a chronic, long-standing necrosis of the pulp with progressive periapical bone destruction. There may be a constant flow from the pulp canal which is not readily controlled, but if the periapical operation is performed first, the purulent exudate is controlled so that a more nearly sterile and dry field is available for insertion of a solid root-canal filling. However, some preparatory work may be done on the pulp canal be-

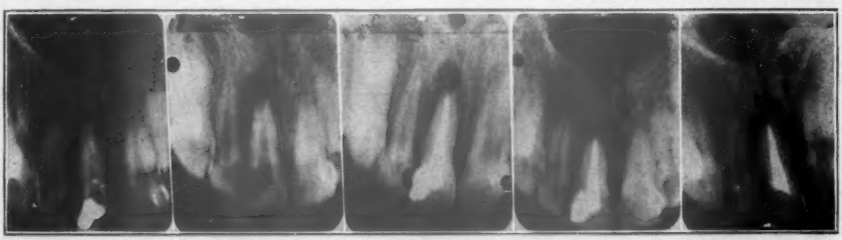


Fig. 1 (Case 1).—Pulpless upper left incisor.

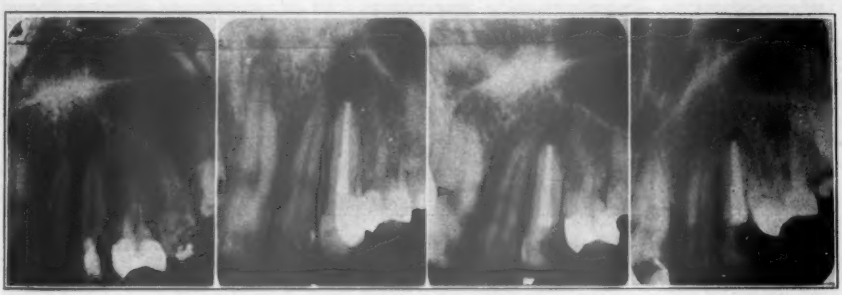


Fig. 2 (Case 2).—Pulpless upper right cuspid.

fore the apicoectomy. Removal of débris, necrotic material and grossly infected dentin from the walls of the pulp chamber and pulp canal prior to the root amputation will facilitate treatment. After this preliminary work is done, the conventional root amputation is performed on the unfilled canal.

Under local anesthesia, a flap is retracted (either a semilunar or a vertical incision), so that the apex of the involved tooth is freely exposed. (If the labial alveolar plate has been destroyed to such extent that the semilunar type of incision would leave an unsupported flap, a vertical incision is desirable. This is an oblique incision anterior to the involved tooth from the mucobuccal fold to the gingival margin. The gingiva is freed around the involved tooth and possibly around the tooth distally from it, a flap remaining that freely exposes the entire buccal plate.) With a small round bur or with suitable hand instruments, the diseased bone is removed over the apex of the tooth in question. The underlying necrotic bony cavity is exposed, involved tissues are excavated and then, with burs, the infected apex is removed and the root end smoothed. Surgical burs are not necessary for this operative work. Regular length handpiece burs are made up to number 10, which gives an ample range of sizes. The regular length burs, being shorter, create less leverage, and better control of the instrument is possible than with the longer surgical burs.

The second step in the operative technic is the filling of the canal. The periapical bony cavity, formed after removal of infected apical tissues and apex, is packed with sterile gauze to control any hemorrhage. With this packing in place, there is no seepage into the canal. Therefore, this is an appropriate time to complete mechanical cleansing and irrigation of the canal. The opening and mechanical preparation of the canal may have been completed at a previous sitting so that there is merely need for a freshening of the walls of the canals (using files), irrigation with a mild germicide and insertion of a well condensed gutta-percha-chloropercha filling. As many points as possible are used in the canal to secure a high degree of density in the gutta-percha. The filling being completed, the gauze that had been placed in the periapical space is removed, the excess root filling leveled and smoothed

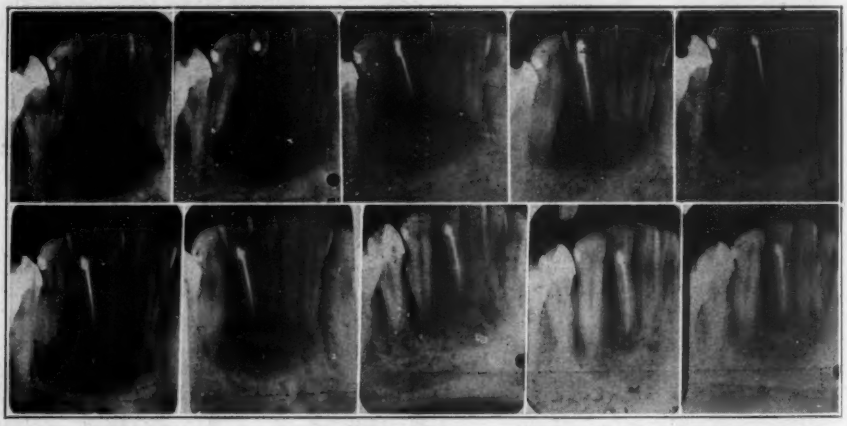


Fig. 3 (Case 3).—Cystic area from lower left cuspid region to lateral incisor.

and the flap replaced, and the necessary sutures are taken.

Little postoperative treatment is needed. In four or five days, the sutures are removed. The follow-up x-ray examinations are the same as for any method of root-canal treatment. Of course, the occlusion is checked at each follow-up visit, to assure that a state of trauma does not exist.

REPORT OF CASES

CASE 1 (Fig. 1).—G. C., a girl, aged 16, with a rheumatic cardiac condition, had a pulpless upper left central incisor, with copious discharge of pus from the root canal, the death of the pulp apparently being due to untreated caries. As a result of medical consultation, apicoectomy and filling of the canal was undertaken. The canal was opened September 14, 1938, and a culture yielded enterococci. At the next visit, the apicoectomy, with periapical curettage and pulp canal filling, was performed. One week later, the sutures were removed. Follow-up roentgen-ray examination indicated an uneventful recovery.

CASE 2 (Fig. 2).—C. O., a woman, aged 30, who was asthmatic, had a pulpless upper right cuspid, the pulp death being due to the presence of an unprotected synthetic porcelain filling. The pulp had been lost several years previously, and there had been recurrent fistulous openings. November 3, 1939, the canal was enlarged, and a culture showed *Streptococcus viridans*. Seepage was difficult to control. At the next visit, November 10, apicoectomy was performed, the canal was filled and sutures were placed. One week later, the sutures were removed. Follow-up x-ray examinations were made March 8 and September 10, 1940.

CASE 3 (Fig. 3).—H. M., a woman, aged 32, in normal health, showed, on full-mouth routine examination, a cystic area from the lower left cuspid region to the lateral incisor. Pressure of the cyst seemed to have separated the lateral incisor and cuspid in the apical region. Electric pulp testing indicated slight vitality in all teeth in the area with the exception of the left lateral incisor, which had a deep-seated synthetic cement filling. Palpation revealed some thinning of the labial plate, but no pain or swelling. The left lateral incisor was opened at the cingulum, whereupon there was a discharge of foul-smelling exudate from the canal. A formocresol dressing was inserted. The canal was enlarged subsequently, and a flap was laid back under procaine anesthesia. A "tissue-paper-like" alveolar plate was present. This was peeled off, the cyst enucleated, the apex of the lateral incisor amputated and the canal irrigated and filled with gutta-percha points and chloropercha. Needed sutures were placed. Subsequent vitality tests were normal for all the other teeth, and, roentgenographically, repair seems satisfactory. It may be noted that normal apposition of the apices of the lateral incisor and cuspid was finally obtained.

CONCLUSIONS

The simple technic for the treatment of periapically involved anterior teeth presented here takes into consideration the cleansing of the dentinal wall of the pulp canal and the removal of infected tissue that has developed externally from the apex of the tooth. In the present national emergency, it is important that there be an economy of time for the dentist and for the patient. This method of management meets these requirements. It is based on surgical principles, not empiricism, and no chemicals are used to achieve the desired results. The method gives confidence in the treatment of pulp and periapically involved teeth that compares with the confidence enjoyed in other phases of dental surgery.

HISTORY OF THE VIRGINIA STATE DENTAL ASSOCIATION FROM 1870 TO 1942

By HARRY BEAR, D.D.S., Richmond, Va.

THE Virginia State Dental Association, founded in 1870, is the repretative body of organized dentistry in Virginia. This association supersedes the Virginia Society of Surgeon Dentists, which was established in 1842. The continuity of these two organizations was interrupted by a series of events and this breach continued until after the War Between the States.

FOUNDING OF THE ASSOCIATION

The reorganization of Virginia dentists took place in Richmond, November 3, 1870, in the office of Judson B. Wood, which was located at 721 East Main Street. There were present at that meeting three dentists who had also participated in the organization of the Virginia Society of Surgeon Dentists in Richmond twenty-eight years before, R. N. Hudson, Richmond, W. W. H. Thackston, Farmville, and John G. Wayt, Richmond.

At the first meeting of this association, a constitution was adopted and in Article III was the following: "The object of this Association shall be to cultivate the Science and the Art of Dentistry, and all its collateral branches, to elevate and sustain the professional character of dentists; and to promote amongst them mutual improvement, social intercourse and good will."

There was no statutory provision regulating the practice of dentistry in 1870. While many practitioners were graduates of a dental college, others prepared themselves by serving only as apprentices. This state of affairs gave much concern to the leaders of the profession of that time. In the by-laws of this association, Article IX provided: "No member of the Association shall take a student for a less term than two years, unless he shall have studied dentistry with some other dental practitioner a sufficient length of time so as to make his term of pupilage equal to two years, and shall agree to attend and graduate at a Dental College."

Indicative of the time and the spirit of the period during which this association reorganized its activities is the address of the first president, James F. Thompson, Fredericksburg, who, at the second annual meeting, in Richmond, November 2, 1871, said, in part:

> In accordance with our preconcerted plans to inaugurate in a more formal manner the Virginia State Dental Association we meet today in this proud old capital of the mother of states, to lay upon the altar of our Association renewed pledges of professional fealty and respect. It is with much pleasure that I greet you upon this occasion and beg to congratulate you upon the success that is now about to crown the efforts of a determined few, who assembled here one year ago, to advance higher the standard of our profession which should be the pride of every dentist's heart. . . . When we look abroad upon this old Commonwealth which but a few years ago lay torn, bleeding and

*This paper, the paper by W. N. Hodgkin on "The Virginia Society of Surgeon Dentists," and the paper by William J. Gies on "The Soul of Dentistry Is Marching On" were presented as a symposium on dentistry in Virginia at the Centennial Meeting of the Virginia State Dental Association, Richmond, Va., April 6, 1942.

impoverished, today stands forth in bright array full of hope and vigor. She garners in an abundant harvest and she sends forth her hardy yeomen and skillful artisans from every section of her borders to this her metropolis to lay upon her common altar the products of their genius and soil, and vieing in honorable competition for a prize, the reward of their labor and skill.

Dr. Thompson concluded his address with the exhortation: "Thanking you gentlemen for your courtesy and kind attention, rest assured that it is my fervent desire that we may all live to be proud that we are members of the Virginia State Dental Association and to see it eminently successful and prosperous, and an ornament to this proud old state whose name it bĕars."

THE PRACTICE OF DENTISTRY

The development of dentistry is intimately interwoven with the progress and growth of the nation as a whole. Its accomplishments parallel in many ways the technological inventions and scientific achievements.

Mordecai, in his book "Richmond in By-Gone Days," published in 1856, referred to the early practice of dentistry in Richmond as follows:

> In the days of my boyhood, only one tooth drawer, who probably never heard the word dentist, did all the work and all the mischief in the dental line. Peter Hawkins was a tall, raw-boned, very black negro, who rode a raw-boned, black horse . . . he carried all his instruments, consisting of two or three pullikins, in his pocket. His dexterity was such that he has been known to be stopped in the street by one of his distressed brethren (for he was of the church) and to relieve him of the offending tooth, gratuitously, without dismounting from his horse.

By 1870, rapid progress was being made in all phases of dental practice. Porcelain teeth and vulcanized rubber had been introduced. Two great contributions by dentists—the discovery of the anesthetic properties of nitrous-oxide by Horace Wells, in 1844, and the introduction of ether as an anesthetic agent by W. T. G. Morton, in 1846—were important factors in this development.

There was still prevalent in those days a remnant of that secrecy which pervaded the profession of an earlier day. Men were hesitant to exchange ideas freely. At the meeting in 1873:

> Dr. Wayt stated that the reason more was not accomplished . . . was the lack of that fraternal feeling which should universally exist. Dr. Thackston in most well timed remarks advised an entire obliteration of all jealous feelings and by consulting one another freely was the only true way to make steady progress.

In spite of this, the proceedings of the association present a wide range of subjects which were discussed at the annual meetings:

> Dr. Steel, Chairman of the Committee on Mechanical Dentistry, made a report on that subject. He reviewed in brief the qualities of the several bases used for mounting artificial teeth, was still of the opinion that there is not, never has been, nor ever will be anything superior to gold for this object, but the demand for something cheap was so great, the profession had been obliged to look around them for some material less expensive than gold or platina. Rubber had been and still was extensively used, but was objectionable on many accounts. Celluloid was now occupying the attention of the profession and promised better results. [1874.]
>
> Dr. Turner spoke of the great necessity of trying to save the natural teeth, even the saving of the roots so as to avoid the use of rubber plates. [1884.]
>
> Professor Hodgkin did not believe that what is termed "rubber disease" existed *per se* but the real cause was that the palatine surface of the plate was not thoroughly polished and then not kept thoroughly clean by the patient.

Another essayist of that time stated at one of the meetings that "tobacco was a good disinfectant, especially desirable for bridgework."

THE FIRST DENTAL LAW

The leaders in the profession were now much concerned about the necessity of

having a law enacted to regulate the practice of dentistry. In 1877, a committee was appointed to draft a bill and present it to the state legislature. In 1883, a bill was finally introduced. This was reported from the committee with the recommendation that it should not pass. It was not until 1886 that the first law regulating the practice of dentistry in Virginia was passed. This law also provided for the first state board of dental examiners. In order to assist the board in its activities, the state association made financial appropriations from time to time to insure its effective operation.

DENTAL EDUCATION

In spite of every effort to raise the professional standard of dentistry, there was continual increase in the number of poorly prepared practitioners. In 1870, the "rudiments of an English education" were required for admission, and the course in dentistry had advanced to two years of five months each. The number of dental societies multiplied at this time and the better educated dentists clamored for more exacting qualifications for practice. The era of apprenticeship was ending and, beginning about 1880, schools were founded in rapid succession.

In 1885, W. W. H. Thackston reported for the Committee on Dental Literature and Education:

> He paid a high compliment to the general "make up" of the *Southern Dental Journal*. Of the dental colleges he saw nothing to suggest, except a faithful and conscientious observance and enforcement of their laws and rules, and the prompt and final abandonment of the mischievous absurdity of matriculating applicants for the lecture terms, who present but the single qualification of "cash in hand" to pay for tickets of admission.

Several years later (1896), H. W. Campbell reported for the Committee on Dental Education and Licensure, in part as follows:

> It would seem then that a certain degree of preparation is essential in entering what we call professional life. I believe it is perfectly right and proper to place certain restrictions on that far too numerous class of persons who arrogate to themselves the right to judge of their fitness to enter any profession, and with effrontery, born of ignorance, knock unhesitatingly for admission at the door of any profession.

As early as 1898, L. M. Cowardin suggested that it would be desirable for dentists to have the M.D. degree. In 1906, Frank W. Stiff read a paper on "Abolish the Dental Degree!! Why? How?" This precipitated a discussion which was carried through several successive meetings. In 1907, the state association appointed a committee to work with a similar committee from the Richmond Dental Society, to exert every effort to have a law passed requiring the M.D. degree before licensure to practice dentistry. There was a sharp division of opinion, but those who advocated the M.D. degree as prerequisite for the practice of dentistry were successful in having a law enacted in 1910, making the provision that those who planned to practice this profession in Virginia on and after 1914 must have the degree of doctor of medicine.

We must recall that, at that time, the requirement for the study of dentistry was graduation from high school. The dental course was three years. The Virginia law at that time did not require a dental degree for permission to take the examinations of the state board. Some were successful in obtaining a license although they had not graduated from a dental college.

There were dental departments in the Medical College of Virginia and in the University College of Medicine. Neither school made definite plans to meet the provisions of the new law which had been enacted providing for the M.D. degree for dental graduates. The law was repealed in 1914, before its provisions became operative, and a new law

was passed which met the requirements of the time and satisfied most of the profession. I am sure that the progressive leaders of that day would be highly pleased with the advances made in recent years in dental education and would be satisfied that their objectives of a higher educational and professional level have been attained in the autonomous growth of the dental profession.

ANNUAL MEETINGS

During the past seventy-two years, the state association has had an active and busy existence. By order of the president of the association, no meeting was held in 1876, but no reason was given in the proceedings for this action. The tenth annual session convened in Charlottesville, August 19, 1879, but since a quorum was not present, the meeting adjourned. The twelfth annual meeting scheduled for Richmond in December 1881 was cancelled because of an epidemic of smallpox at that time. Annual sessions have been held regularly since that date. The association was incorporated by an act of the state legislature, January 14, 1890.

Coincident with the growth and development of the Virginia State Dental Association was the founding of the Southern Dental Association, in Atlanta, Ga., July 28, 1869. While that organization was a sectional group, as its name implies, it became more nearly national in scope through its services to the confederate states during the period of reconstruction. The Southern Dental Association met regularly and continued its effective service for twenty-eight years.

The Virginia State Dental Association was host to the Southern Dental Association in Richmond in 1872. The minutes of the Virginia Association show that its members entertained the "Southern Dental Association by a trip up the canal and a supper at the Pump House." The Virginia Association met jointly with that organization at Old Point in 1887 and again in 1894 and 1887. In 1913, the organization became the Southern Branch of the National Dental Association, and its meeting was held with the Virginia State Dental Association at Old Point in that year. Virginia contributed three presidents to the Southern Dental Association: H. M. Grant, of Abingdon, in 1873; W. W. H. Thackston, of Farmville, in 1887, and E. P. Beadles, of Danville, in 1888.

May 6, 7 and 8, 1897, the Virginia State Dental Association held a triunion meeting with the Maryland State Dental Association and the District of Columbia Dental Society at Old Point. In August of the same year, the Association met again at Old Point for its regular annual meeting and for a joint session with the American Dental Association and the Southern Dental Association. It was at that meeting that the last two organizations amalgamated to form the National Dental Association in 1897.

The thirty-eighth annual session of this association was held at the Jamestown Exposition, September 9-12, 1907, as a part of the Jamestown Dental Convention, which was a national congress of the dental profession. George F. Keesee, Richmond, was secretary-general of the congress. Other Virginians on the Committee on Organization included Frank W. Stiff, Richmond; H. Wood Campbell, Suffolk, and R. H. Walker, Norfolk. William Pilcher, of Petersburg, was Virginia chairman for membership, and Richard L. Simpson, of Richmond, was state chairman of clinics.

In 1913, the National Dental Association reorganized on a plan whereby the several state societies became component units of the parent organization. The same year, the Virginia Association voted to become an integral part of the national organization. This association is now organized on component units and the state is geographically subdivided into eight district societies.

It is of interest to record that the

American Dental Association held three annual meetings in Virginia at Old Point, in 1894, 1897 and 1900. The National Association of Dental Examiners held four sessions at Old Point, 1894, 1897, 1900 and 1909, and Virginia contributed three presidents to that organization. H. Wood Campbell, Suffolk, in 1906; John P. Stiff, Fredericksburg, in 1913, and W. N. Hodgkin, Warrenton, 1940.

It is also noteworthy to point out that the Dental Educational Council of America was organized in 1909, at a meeting held at Old Point. That council has had a salutary effect upon dental education, and its record of achievement marks an epoch in the annals of dentistry. Its function and activities have now been taken over by the Council on Dental Education of the American Dental Association.

DENTIST ON STATE BOARD OF HEALTH

Of particular significance to this group is the recognition that Virginia has received in being the first state, as far as we know, the state legislature of which provided for appointment of a dentist on the state board of health. To the late H. Wood Campbell belongs the credit for being responsible, in a large measure, for this law, which was passed in 1916. Guy R. Harrison was the first appointee as the dental representative on the Virginia State Board of Health. He has been reappointed by every succeeding governor and has served continuously for twenty-six years, with distinction to himself and honor to the profession for his many contributions to public health in general.

This association has held two meetings outside of the state. In 1895, the association met at White Sulphur Springs, W. Va., and, in 1923, it met jointly with the North Carolina State Dental Society at Pinehurst, N. C. In 1926, the North Carolina State Dental Society met jointly with this association in Richmond. In 1932, this organization met with the West Virginia State Dental Society at Winchester.

In the period under review, our whole social, scientific and economic life has undergone a complete metamorphosis. This era was characterized by the introduction of many new inventions affecting life in general. The telephone, electric lighting, the trolley car, the automobile, motion pictures, the x-rays, the airplane and the radio have materially influenced our daily lives. Dentistry, too, has been notable in its achievements. In 1870, there were 196 dentists in Virginia. Today, there are 896 resident registered dentists in the state. Dental education, dental literature and dental organizations have been and are important factors in this march of progress. The Virginia State Dental Association and its predecessor, the Virginia Society of Surgeon Dentists, are beacon lights in the progress and development of this great profession. The accomplishments of the past are a challenge to the future.

410 Professional Building.

THE SOUL OF DENTISTRY IS MARCHING ON*

By William J. Gies, Ph.D., New York, N. Y.

I

I HEARTILY congratulate Virginia dentists on the distinction of being the professional descendants of those, in the "Old Dominion," who organized the first state dental society in America; established the first incorporated dental society in the world; and brought about the first legislation placing dental interests under the control of the organized dental profession. I am very happy to participate in your centennial anniversary of these very significant events of the years when dentistry was awakening to the call of its professional destiny.

Felicitation is the keynote in the celebration of a centennial anniversary. But such a celebration also occasions comprehensive review of historic events, in appraisal of their character and relative importance, in appreciation of their present significance and influence and in anticipation of trends that may flow from them in the years to come. The very interesting reviews in the papers by Drs. Hodgkin and Bear presented valuable historical summaries. In reflecting on the theme that might usefully be selected for the present paper, there passed before my "mind's eye" a moving picture of a procession of events in the history of dentistry—a picture that I examine very often. In that picture, I see dentistry moving steadily forward on a long and difficult path through successive stages of excellence and beneficence in health service. I see dentistry as a profession that has high ideals, important duties, special opportunities; a profession that has identity, personality, self-respect, responsibility, solidarity, continuity—a *soul*. That the title of this paper represents, for me, a persuasive reality may be indicated by the following comment that I made six years ago:

> Years ago when, proceeding along the route of biochemical research, I had occasion to make myself intimately acquainted with dentistry, my observations and reflections led me promptly to do what every dentist should—I realized the full significance of dentistry, and *idealized* it as a philosophy and as a procedure in public service. *Idealization of the dental profession has literally wound me up and keeps me going.* I respect dentistry as one of the most useful, effective, and desirable agencies for the promotion of comfort, health, and welfare. I admire dentistry for its nobility of purpose; its efficiency in procedure; its value in achievement; and its progressive effort, through self-examination and self-criticism, continually to make itself better and more serviceable. My appreciation of the dental profession as it exists today, my faith in its future, my wish for its cumulative support, and my desire to see it fully esteemed everywhere at its true value, are among the sentiments that hold my abiding active interest. When, therefore, I offer opinions regarding dentistry . . . my comment, right or wrong, arises earnestly from the complex of these ideals, sentiments, and aspirations relating to the advancement of your profession.[1]

1. Ann. Dentistry, 3:116, September 1936.

*This paper, the paper by W. N. Hodgkin on "The Virginia Society of Surgeon Dentists" and the paper by Harry Bear on "History of the Virginia State Dental Association from 1870 to 1942" were presented as a symposium on dentistry in Virginia at the Centennial Meeting of the Virginia State Dental Association, Richmond, Va., April 6, 1942.

II

Dentistry became an organized profession a hundred years ago, when inspired leaders — among them Virginia dentists—created the first dental journal (1839), the first national society of dentists (1840) and the first dental college (1840). Within a period of a few months, constructive leadership such as had never before appeared among dentists laid the enduring foundations of publication, of organization, and of education, on which has been based the ensuing evolution of the organized dental profession.

In my interpretation of the events of this great era in dental history, the decisive factors in the minds and hearts of the leaders—the inspiring influences that impelled organized dentistry onward in this evolution — were intelligence, courage, conscientiousness, publicspiritedness, aspirations in personal achievement and ideals of service. The records of this era present many evidences in support of this opinion. Thus, as Dr. Hodgkin stated in his paper, the first business at the meeting of organization of the Virginia Society of Surgeon Dentists (1842) was the adoption of a resolution containing these basic concepts:

> Dental science would be greatly benefited and advanced, and the interests of its practitioners and of the community at large promoted, by the formation of a state society for the purpose of uniting the energies of the profession to distinguish and reward merit and to discountenance and expose quackery and charlatanism . . .

This resolution was literally an embodiment of the "decisive factors" which, I have suggested, were collectively the mainspring of the national movement.

A superficial reading of the history of the "amalgam war," to which Dr. Hodgkin referred, might suggest that, during that conflict, these "decisive factors" were no longer dominant in dental leadership. It seems obvious now that these "inspiring influences" were temporarily ranged on opposite sides of a problem that then was very perplexing. It is evident that the "amalgam war" had a devastating effect on the morale of the leadership for a long period in the early years of the new dentistry. It is also clear that that "war" was due essentially to a conflict in professional idealism between the leaders who regarded amalgam as a device and the support of charlatanry, and the leaders who, adhering to ideals of professional freedom, believed that amalgam, despite its origin in disrepute, could be used in worthy service for the patient. Time healed the wounds of disagreement and revealed the realities for restored understanding. Unfortunately, the rate of progress in the evolution of organized dentistry had been retarded. But a reunited leadership, animated by the "decisive factors" to which I have alluded, turned dentistry's steps forward on the truly professional path, which, with occasional digressions and temporary halts, has been followed ever since.

III

When we give attention to "things as they are," we see that the "decisive factors" that initiated the evolution of organized dentistry have not lost their potency. For the sake of directness and brevity, let us note current general conditions, and some of the steps thereto, in three of the activities which have promoted the progress of organized dentistry; namely, organization, journalism and education.

Dentistry is now more comprehensively and effectively organized than the most optimistic founders of the first national and state bodies could have anticipated. National, state and local societies of practitioners are supplemented by associations of schools, examiners, researchers and editors; also by fraternities, honorary societies and many other special organizations. Collectively, these bodies

are animated by, and serve in, the professional spirit voiced in the Virginia resolution adopted in 1842—to benefit and advance dental science, to promote the interests of the practitioners and also of the community at large, to distinguish and reward merit, to discountenance unworthiness. The effectiveness of the organization of dentistry is attested by this comment in a statement, prepared for publication in the next issue of the *Journal of the American College of Dentists* by an informed layman, Dr. Wilmer Souder, of the National Bureau of Standards:

> Few professions maintain better services than those supplied by the American Dental Association and its component organizations. Texts and journals are available in abundance. Special services are supplied as needed. The Research Commission of the American Dental Association has affiliations which enable it to prove or to disprove statements regarding technics; to test restorative materials; and to list, by trade name, those materials which are known to be safe. The Council on Dental Therapeutics guides the profession safely through the allurements of periodic exploitations, past noisy enthusiasms, and over the entangling confusions always associated with real or imaginary developments in the field of dental therapy. The honorary and specialized organizations offer many additional opportunities for the enhancement of the professional status.

In dental journalism, development has been analogous to that of the number and kinds of organizations of practitioners. For a time, unfortunately, supply-house periodicals weakened the early attempt to sustain professional dental journalism. Fortunately, a return to the professional ideals of the *American Journal of Dental Science* (1839-1860) has been actively in progress during the past three decades. Today, proprietary periodicals have been almost completely superseded by journals conducted under the auspices of dental societies—journals which represent professional integrity, fidelity and responsibility, and which merit public respect as truly professional both in character and in function. The American Association of Dental Editors, organized in 1931, consisting of representatives of non-proprietary journals, is dedicated to continual efforts to improve the quality of dental journalism.

There was one dental college in 1840. Now there are thirty-nine dental schools, each of which is non-proprietary and nearly all of which are integral parts of larger educational institutions. For about sixty years, associations of dental teachers and faculties, appropriately influenced by the requirements of the boards of examiners that legally represented the states, and aided simultaneously throughout the latter half of this period by official councils on dental education, have coordinated the plans in undergraduate dental education, have continually furthered improvement in the instruction to prepare effectively for the duties of dental practice and have made education for dental health-service eminently successful. The American Association of Dental Schools, organized in 1923 by amalgamation of several associations, is actively engaged in promoting advancement in all aspects of dental education.

Although in this review lack of time necessitates brevity and omissions, one additional outstanding condition of constructive influence, closely related to education, should be emphasized. An important factor in dentistry's development, which, although not included among the formal projects of the founders of organized dentistry, was implicit in their objectives, has been achievement in dental research. Research is effort, by any effective means, to establish new knowledge for the promotion of more nearly perfect understanding, or for the establishment of more advantageous conditions or procedures. Among the most distinguished achievements in research in any field, and second to none in human beneficence, were the studies, experiments and findings in dental research that en-

abled dentists Wells and Morton, during the first decade of organized dentistry, to give to mankind the boon of general inhalation anesthesia, which by one agency or another has been a routine surgical procedure ever since.

For many years during the development of organized dentistry, research, although conducted with great success by a few eminent workers, had not become a general influence. During the decade ending in 1920, the creation of the Research Commission of the American Dental Association, the establishment of the *Journal of Dental Research* and the organization in this country of the International Association for Dental Research, each expressive of high professional ideals, collectively gave the stimulus to interest and developed the momentum in effort that have been carrying dental research steadily forward with cumulative success. An increasing number of dentists, dental teachers and workers in biologic and other sciences are now making research an increasingly constructive force in dental progress.

IV

"The soul of dentistry is marching on." Is it continuing on the route along which dental history has been proceeding? Does dentistry seem to be threatened by any special dangers? Turning from retrospect to prospect, I select for discussion two general conditions, of which one appears to be both an obligation of, and an opportunity for, dentistry. The other seems to endanger the welfare of the dental profession.

Progressive dentistry, which has grown steadily and achieved worthily, has a great continuing obligation in public service. Dentistry, which has demonstrated its competence to meet its responsibilities, may be reasonably expected to perform all its duties with distinction. In this faith I believe that the outstanding obligation of, and opportunity for, organized dentistry is to endeavor, more effectively than ever, by a plan of its own design that would be more inclusive than any now in operation, to assure the beneficence of dental health care for every person when in need of it. Official statistics indicate, in general terms, that at present 22 per cent of the people in this country receive needed dental health care; that 58 per cent do not receive it, but are able to pay for it; and that 20 per cent do not receive it and are unable to pay for it. These conditions, and their consequences, raise many pertinent questions, such as these: Is the dental profession as an organized body actively endeavoring, in accord with its humanitarian objectives, to perfect plans for public adoption by which the 58 per cent and 20 per cent groups of the population may receive the dental health care that they need? Are the individual members of organized dentistry giving this urgent matter the attention that it requires? What action in this relation do you of this state suggest to the American Dental Association? Is the official leadership of organized dentistry responsive to the expressed convictions of the constituent members? Are the uncertainties and difficulties in this situation so great or puzzling that the leadership of organized dentistry is unable to propose a practical solution of this problem, and thus is affording opportunity for social economists, political officials or others to tell the dental profession what it must do, and when and how? What, if anything, is lacking—ideals or attention or ingenuity?

In pressing ideals upon your attention, am I talking like an impractical visionary? Before you answer "Yes" to *that* question, listen to what may be said on the significance of ideals:

> An ideal is something that exists only in idea. It is a standard of desire, a model of perfection. It cannot be fully attained. Yet as a conception, as an ultimate goal, as a vision of reality, an ideal in responsive personalities may encourage, influence, and

bring about the highest forms of behavior and achievement. Although ideals exceed reality, they are paradoxically the highest forms of reality! Ideals are the basis of justice, the foundation of generosity, the mainspring of altruism, the justification of a profession. One never hears of ideals of selfishness, injustice, meanness, cruelty, or of any quality, condition, or objective that is not inherently ennobling. Familiar quotations come to mind: "Our ideals are our better selves." "What is left when ideals are lost?" One of the poets of antiquity wrote the immortal line: "Where there is no vision, the people perish." It may be said, with equal truth: where there are no ideals, professions decay.[1]

The ideals that animate the questions I have raised do not suggest a particular plan for the solution of the stated problem. But these ideals persuade me to continue to urge the need for constructive effort to meet the responsibility now clearly devolving upon organized dentistry. These ideals lead me to suggest some basic principles that should characterize prospective plans for the extension of dental health care to all who need it:

(a) All plans for this desirable extension of dental health service should be based on the Golden Rule, applied equally to patients and to practitioners.

(b) The more exacting a health-service profession may be, in its demands upon the time, attention and ability of the practitioner, the greater should be that profession's assurance of remuneration sufficient to maintain the competent practitioner in a degree of physical comfort and economic serenity to enable him, when reasonable in his requirements, to perform his professional service efficiently. The public welfare requires that those who devote themselves faithfully to the work of a profession shall be able to do so contentedly. This is one aspect of the Golden Rule.

(c) There is another aspect, for the Golden Rule is not unilateral in its application. The humanitarian purpose of dentistry implies that dentists not only individually, but also collectively, as an organized profession, will endeavor to bring about public and professional conditions that jointly, in fairness to all concerned, would extend ample dental health-care to all who need it.

(d) The majority of the population who do not receive needed dental health-care, but are able to pay for it, should be given, through the agency of departments of health or other distinterested sources, recurrent evidence of (education on) the importance of obtaining systematically the benefits of dental health care.

(e) An adequate plan for public financial assistance should be devised, and urged by the dental profession for public adoption, to support dental health care for the minority of the population who are unable without help to pay for it.

(f) The dental profession, by action and guidance, should achieve universal distribution of ample dental health care as a welcome opportunity in voluntary service, rather than, after excessive delay in action, as a task in political servitude.

(g) Inseparably associated with these obligations of the dental profession are two others of related and special importance. Prevention of all dental disorders is the ideal of ultimate dental health care. The dental profession will continue devotedly to make its service as effective as possible with the most useful means available. While eagerly awaiting the day when complete prevention will be attainable, the profession should actively encourage and support promising efforts to establish new knowledge and better procedures to that end. Applications of useful new truth and inventive adaptations of better means are essential for professional development, and these are fruits of research.

(h) While awaiting the discovery of more complete means for the prevention of dental disorders, the dental profession

should focus its attention upon the dental welfare of children. The public should be intimately informed about the advantages of protective dentistry in early childhood as assuring prolongation of the health and functions of the teeth, and also of the general health, of all who receive such service.

V

The second of the general conditions reserved for discussion—the one that seems to endanger the welfare of the dental profession—is the recurrently expressed desire that the dental profession be discontinued and that dental health service be conducted or directed by physicians. During the past century, there have been numerous proposals that dentistry, or a portion of it, be made a specialty of medical practice. You will recall that Dr. Bear's paper contained an allusion to a phase of this situation in Virginia, culminating in the enactment in 1910 of a law requiring admission to dental practice to be based, in and after 1914, on education leading to the M.D. degree, a law that was repealed before it became effective. As a rule, such proposals have been made by dentists, not by physicians. The latest step in this direction, the new dental program at Harvard University, is an exception, having been formulated by a committee consisting chiefly of physicians, one of its dental minority dissenting.

As an introduction to a discussion of this situation, a few direct allusions to personal experience may be useful. During the academic year 1921-1922, in visiting each dental school in the United States and Canada, whole-time attention was given to and whole-hearted interest taken in dental education and its public responsibilities. During that year of visitations, I concluded that the term "health service," and the enlarged import I then assigned to it, would provide a broad basis for the ultimate solution of the problems of medicodental relationships. "Health service," a neutral term, avoids partisan implications. Four years later, this conclusion, strengthened by the results of preliminary applications and by further experience in the designated study, was incorporated in the Carnegie Foundation's Bulletin on Dental Education (1926). To prevent confusion or uncertainty regarding the enlarged import of that term, it was stated in the bulletin that "health service" was used, in a non-technical sense, to signify the following conditions: "Any and all private and public means to maintain or to promote health, to prevent disease, to restore health by treatment and cure of sickness, and to alleviate the discomfort, distress and disability of incurable ill-health." It was explained also that, in this use of the term, "public-health administration, education for the prevention of disease, medicine, dentistry, nursing and pharmacy are important divisions of health service."

Among the general conclusions in the report to the Carnegie Foundation, based on this enlarged concept of "health service," were these on medicodental relationships:

> Dentistry is an important division of health service relating directly to the teeth and closely adjacent oral tissues, and indirectly to other parts of the body, to the organism in general, and to the transmission and prevalence of some communicable diseases.
>
> The unusual mechanical and esthetic demands upon dentistry have fully justified and continue to require its active development as a separately organized profession.
>
> Dentistry, in the quality and efficiency of its service to the patient, should be made the full equivalent of an oral specialty of the practice of medicine.
>
> Dentistry can be effectually and economically developed to the full service-equivalence of an oral specialty of the practice of medicine through extension and improvement . . . of that system of dental education which, though separate from medical edu-

cation, is closely related to it and should be more intimately associated with medical schools, hospitals, and dispensaries.

[For] full attainment of [this] service equivalence [there should also be] establishment of dental service including dental interneships in hospitals, and of dental infirmaries in the out-patient departments; and the proper use of these clinical resources and opportunities not only for the instruction of undergraduates, but also for the promotion of graduate work.

In this view of an enlarged dentistry, its practitioners, instead of examining only the teeth and mouth of a patient, as is now usually the case . . . would also suitably enquire into and keep careful records of the state of the patient's health, particularly as it affects or is modified by conditions of the teeth and mouth. Dentists . . . would also recognize and note the significance of outstanding symptoms of systemic disease, and warn or advise the patient accordingly, or explain his need for a physician's attention; and could effectively discuss, with a physician, the oral conditions in their relation to a patient's general welfare.

The foregoing conclusions on the further autonomous evolution of dentistry were published sixteen years ago. Dentistry, as I continue to envisage it, is a *natural* division of health service. In this country, dentistry, owing to intrinsic merit, has grown into a separately organized profession that is steadily becoming stronger and worthier. While retaining its independence and freedom, it should be made the service equivalent of the best possible oral specialty of medical practice, without any extensions or intrusions into medical practice, and brought, in public duties and in private relationships, into the closest attainable mutual accord and cooperation with all other divisions of heath service. This is a program in which individual self-respect, general tolerance, professional cooperation and public benefit are effectually blended. In dentistry's relationships with all other professions, the ideals of independence with interdependence and coordination without subordination merit your allegiance because they guard your self-respect, fortify your professional purposes and opportunities and guide you into useful correlations in public service. The relations among the health-service professions should be those of fraternal accord. Physicians should be as elder brothers to dentists—a very becoming relationship, in mutual esteem, confidence, good-will and cooperation, in the health-service family.

All suggestions that dentistry be made a specialty of medical practice should be examined in the light of this crucial question: Would the conversion of dentistry into a specialty of medical practice make dental health service more efficient than it is, and will be, as the major responsibility of a separately organized and growing profession? As a layman having intimate associations with, and deep respect for, each profession, and after thorough studies of all the related proposals, including the latest, I feel that the answer to this question, in the public interest, is no. My reasons for this negative conclusion include such insistent realities as those that are indicated below:

(1) Dental health service requires kinds and degrees of attention, skill and physical effort that are remote from the interest and aptitude of those who commonly elect to engage in medical practice. These conditions in dental health care account for the fact that the medical profession has been traditionally unconcerned about dental disorders and continues to be inattentive to dental health care.

(2) The requirements in dental health service that have been unattractive to physicians are due, in the main, to the relatively non-dynamic nature of the teeth. Fully formed human teeth, unlike other parts of the body, exhibit this remarkable coordination of non-dynamic qualities: (a) Teeth do not produce within themselves any material that, passing from them into the circula-

tion, is useful elsewhere in the body. (b) Teeth are feebly or wholly unresponsive to systemic therapeutic treatment. (c) The main mass of a tooth is a dense and hard mineralogic structure, in which metabolic activity and powers of self-repair are slight or absent. (d) Teeth participate directly in the performance, by transmission, of a high-pressure function. (e) Teeth may be removed without serious injury. (f) Artificial substitutes may be functionally adequate. Dentistry's success in artificially repairing, and in providing functionally adequate substitutes for, teeth—which can be accomplished for very few parts of the body—has helped to minimize the interest of physicians in dental health care.

(3) These coordinations of nondynamic qualities account (a) for the inability of fully formed permanent human teeth effectively to repair traumatic injury, to replace material removed in functional use or to repel bacterial invasion; also (b) for the impressive facts that permanent teeth, owing to the relatively inactive metabolism in their solid portions—their biologic defenselessness—are more commonly destructively diseased, from early childhood in civilized man, than any other part of the body, and their diseases cannot as a rule be cured, even in periodontal aspects, by measures commonly used by physicians in the therapy of many maladies. These anatomic, physiologic and pathologic relationships, and the associated reparative, restorative and substitutive procedures in dental practice, have given teeth a unique position in health service. These conditions account for the fact that, owing to the ensuing intricate and exacting mechanical requirements in the treatment of dental disorders, the number of dentists in active practice in this country is approximately half the number of physicians, including all the specialists of medical practice. This division of health-service functions accords with the principle that separate organization assures intensive and sustained attention to objectives, interests, or causes that would not be effectively furthered without such special collective effort.

(4) Until research reveals ways and means to prevent dental disorders, and until prospective discoveries provide protective procedures that are not mechanical in character, the routine technical requirements of professional dental health care will presumably continue to be chiefly mechanical in quality. Exceptions related to the tissues that support the teeth do not alter this prospect.

(5) The proposals to convert dentistry into a specialty of medical practice always convey the suggestion, or the implication, that the physicians who would thus practice dentistry would learn what should be done, but would instruct others to do most or all of the ensuing intra-oral handwork, in at least the so-called "simple procedures." This conception overemphasizes the importance of a wide range of medical information that is superficial, irrelevant or immaterial in dental health-care, and it also underestimates the value of precise, relevant and skilful procedures, for dental conditions requiring treatment, which ordinarily are not applicable to disorders in other parts of the body.

(6) Suggestions that dentistry should be made a specialty of medical practice are usually based on these assumptions: (a) The professional education for dental practice, as now conducted in the dental schools, does not prepare the graduates adequately for the performance of their functions. (b) The instruction leading to the M.D. degree, instead, would assure complete proficiency in dental health care. The following quotations from recent authoritative medical publications present information that is commonly ignored by those who express these assumptions:

(A) COUNCIL ON MEDICAL EDUCATION: AMERICAN MEDICAL ASSOCIATION; MEDICAL EDUCATION IN THE UNITED STATES (1934-1939)

Realizing that there was no limit to the various types of training and experience which would be advantageous to the practising physician, and appreciating the futility of attempting to include even a small percentage of these in the four-year undergraduate medical curriculum, medical educators [recently] began to study carefully the absolute essentials to a sound foundation for a career in medicine. . . . All of this . . . is merely evidence of a recognition of the breadth of the field of medicine and of the limitations of any formal educational program. . . . No attempt is made to have a student during the undergraduate course cover the entire field of medicine or even consider completely such specific subjects as anatomy, physiology or pathology. The higher ranking schools merely seek to have their students build a sound foundation for future development in their careers in medicine. (Page 80.)

(B) DR. LEWIS H. WEED: PROFESSOR OF ANATOMY AND DIRECTOR OF THE MEDICAL SCHOOL OF JOHNS HOPKINS UNIVERSITY, AND A MEMBER OF THE COMMITTEE THAT FORMULATED THE NEW DENTAL PROGRAM AT HARVARD UNIVERSITY; J. ASSOC. AM. MED. COLLEGES, 1939

Everywhere throughout medical schools today, there is realization that in any of the prescribed divisions of instruction the student has time merely for an initial survey of the subject matter of that branch of medical knowledge. The fund of information is too large in every one of these subjects: the student can, at best, obtain merely the biological philosophy of the subject, hardly the pertinent details. He learns in a preliminary way the manipulative procedures employed in the field for the acquisition of knowledge, but the acquirement of technical skills is postponed in this educational process to the intern-resident years, or to the years as laboratory assistant. Our four-year medical course, therefore, becomes a preliminary canter across a wide and rugged field. The student acquires a general comprehension and a philosophy in each course rather than a great body of specific knowledge and a mastery of technical procedures. (Page 287.)

The system of medical education that is thus commended, if used as a basis for dental practice, would teach the prospective physician-dentist much that is included in the theoretical foundations of medical practice, but would postpone to postgraduate years his training in the technical procedures relating to the teeth that he himself might apply to his patients. This would seem to be a direct route to the well-known inadequacies of "European dentistry."

It is obvious that the essential education for any profession should include acquisition of basic knowledge of the fundamental sciences, attainment of a scientific point of view, encouragement of initiative, inculcation of efficient methods of work and a solid foundation for self-instruction throughout a career. The suggestion that dental faculties are deficient in developing these essentials in their students, and that education for dental practice would be perfect if included in medical education, prompts special attention to the following additional quotation from the Medical Council's report on "Medical Education in the United States (1934-39)":

[At present] more than 98 per cent of the graduates [of the medical schools] devote from one to five or more years to securing additional training in the hospitals and medical laboratories of the country before beginning the independent practice of medicine. (Page 80.)

(7) Some who advocate conversion of dentistry into a specialty of medical practice appear to believe that the instruction leading to the M.D. degree is conducted on a very definite program, and that the desirable phases of medical understanding for dental practice can be imparted only by adherence to this precise curriculum in medical schools. At the recent annual meeting of the American Association of Dental Schools, in a discussion of only one aspect of this situation—courses in the basic sciences, which are intended to create the biologic foun-

dations of health service—I presented the following data:

From what some observers state about the basic science courses in medical schools, and about the great importance of duplication of these courses for dental students, one naturally would assume that these courses supply definite measures of exact knowledge for precise understanding in a prescribed scientific area. When, however, one seeks to determine the nature of the inherently important content of the basic science courses as taught to medical students, so that the value of these courses for dental students may be estimated, a condition of variability and of great disagreement among medical faculties becomes strikingly evident. Thus, to use only one criterion of many for evaluation—i.e., the *number of hours* of prescribed instruction [to say nothing of variability in the quality and effectiveness of the teaching]—the following summary indicates the current range in undergraduate medical education, as stated by the Council on Medical Education in its report for 1934-1939:

Subject	Range of hours of instruction
Anatomy: gross	220-600
Bacteriology	90-326
Biochemistry	100-360
Pathology	176-396
Pharmacology	88-273
Physiology	180-556

Since there is this wide variation in the teaching time for these sciences in undergraduate medical education, what becomes of the alleged importance of duplicating these time requirements for dental students? If the lower requirements are adequate, why should there be insistence on higher ones? If the lower requirements are not adequate, how can graduates of courses on these inferior requirements be acceptable? Who can or does decide which requirement in any of these subjects is more important than any other requirement? If medical faculties may exercise this freedom of judgment, why may not dental faculties do likewise?

(8) It is said by some (a) that disorders of the teeth cannot be understood and treated by any one who has not received all of the general and digressive current instruction leading to the M.D. degree, and (b) that abbreviated and adapted courses in medical subjects of instruction for dental students cannot be sound foundations for current service and future self-instruction by any dental practitioner. The "Final Report of the Commission on Medical Education" (1932, pp. 216-217) contains this related comment:

Dentistry has its roots in the same biological soil that nourishes medicine. It should have the same *character and quality* of fundamental training in the sciences, *adapted, to be sure, to its own needs and problems.* [Italic not in the original.]

This and the preceding quotations do not support the idea that the whole of the education leading to the M.D. degree is a prerequisite for competent practice of dentistry. But if this assumption were valid as related to dentistry, it would obviously follow that no one should be permitted to begin the practice of medicine who has not mastered each of the many sciences on which medical practice is theoretically based—an impossibility in a lifetime of effort by any one.

VI

Dentistry has become a natural division of health service. While steadily going forward and growing stronger as a separately organized profession, it is becoming also the full service equivalent of the best possible oral specialty of medical practice, without acquiring redundancies that have been accumulating for the specialties of medical practice. By preference and accommodation, dentistry is being closely coordinated, in all practical phases, with the other health-service professions, as it is in the Medical College of Virginia, which, as a group of effectively correlated schools, I often call a "University of Health Service." Dentistry's continual growth in "health serviceability," and increasing public understanding and appreciation

of the import of dentistry's autonomous development, give ample assurance that the dental profession will not be ruled, coerced or absorbed by any other profession, and that dentistry's natural domain will continue to be amply protected against dismemberment.

The founders of organized dentistry in America left a noble heritage. Their professional descendants have brought dental health care to a stage of international eminence in health service. Strengthen, in the public interest, the splendid evolution in which you are participating. May your successors, in each of endless generations, merit the commendation that *you* deserve. To all dentists, I make this direct appeal: Be grateful and happy that you are among the accredited servants and benefactors of mankind. In your daily progress, follow impulses and leadership that express, in integrity, fidelity, service and lofty purposes, the finest that is in you, individually and professionally. "The soul of dentistry is marching on." Keep on proudly marching with it.

630 West One Hundred Sixty-Eighth Street.

THE VIRGINIA SOCIETY OF SURGEON DENTISTS*

By WILLIAM N. HODGKIN, Warrenton, Va.

IN most states of the Union, the date of organization of the present state dental society—usually under the same society name as when formed, or at least having a continuous existence under one or two names—answers rather generally the needs of dental history. There are, however, instances in which such records scarcely contribute to accuracy, and at times they neglect the most significant events in state organizations.

A case in point may be found in Virginia, where the present Virginia State Dental Association was organized, or reorganized as you will, in 1870. This organization date, while accurate so far as it relates to postbellum history, is misleading in its implication and lends itself to a more searching examination of earlier dental organization in the United States, particularly in the two decades before Virginia became the main battleground of the nation and suffered conditions precluding the organized existence of any scientific group.

The decade of 1840-1850 is usually regarded as the most momentous in dental history. Bringing, as it did, the first national dental society, The American Society of Dental Surgeons (hereinafter referred to as the American Society), the first dental periodical, *The American Journal of Dental Science* (hereinafter referred to as the *Journal)* and the first dental school, the Baltimore College of Dental Surgery, it may be studied briefly to gain the background of dental conditions generally prevailing at the time.

The dental census for the foregoing decade showed 2,923 dentists in the United States, with Virginia among the five Eastern States listing more than 100 practitioners within their borders. The census for the following decade of 1850-1860 is an index to the westward trend

*This paper, the paper by Harry Bear on "History of the Virginia Dental Association from 1870 to 1942" and the paper by William J. Gies on "The Soul of Dentistry Is Marching On" were presented as a symposium on dentistry in Virginia at the Centennial Meeting of the Virginia State Dental Association, Richmond, Va., April 6, 1942.

in our national development, for twenty states recorded more than 100 dentists, with a national total of 5,606, and Virginia had stepped up from only 140 to 196. By 1870, the national dental population had grown to 7,839, with Virginia gaining only two over the previous decade, though, of course, losing the twenty-seven credited to the new state of West Virginia.[1]

With a knowledge of the earlier dental census in mind, and recalling the known comparatively settled conditions and advantages enjoyed among her people, it would be difficult for the student of dental history to reconcile the inference that Virginia lagged in dental organization until 1870 and was preceded more than a full decade by dental organizations far to the sparsely settled West. And no effort should be made to reconcile such apparent tardiness in organization on the part of practitioners of dentistry in Virginia. In truth, they not only played a full part in the organization of the American Society, but also, in their own organization of the Virginia Society of Surgeon Dentists (hereinafter referred to as the Virginia Society) in 1842, they established the first state dental society organized as such, and the one that became in 1845 the first incorporated dental society in the world.[2]

There were other priorities in the accomplishments of the Virginia Society, but it is not in a spirit of claiming priority that factual material is advanced. Rather, because the ideals and aims, even many of the problems, of this early group were so akin to our own, and because their recorded actions reveal such professional foresight and tolerance, they richly merit study in this centennial year of their organization, both in the interest of historical accuracy and in dutiful recognition of the true founders of the profession in Virginia. It is such conviction that prompts a recital of salient happenings and a sketch of outstanding characters in the Virginia Society; not with any idea that it is complete, but with the pledge that it is authentic and with the hope that, feebly though the narrator plays his part, it will lead to further study of those pioneers who so admirably played theirs.

Then current conditions in dental practice figured largely in the background of early dental organization. It will be recalled that Horace H. Hayden had advocated dental organization as early as 1817, but his advocacy had received scant response over a period of years save among a progressive and outstanding group in and around New York City, where the first dental society was organized in 1834.[3] But about the latter date, two events awakened the profession to the advantages of associated effort and interchange of ideas, as urged by Hayden. One was the appearance in New York of the conscienceless Crawcours and the malodorous Mallan with the lowly amalgam to which they gave the noble name of "royal mineral succedaneum." Not only were they unprincipled in the use of a faulty material—pressing it into unprepared and undried cavities, often into interdental spaces where no cavities existed—but also their practice was the beginning of the high pressure advertisers, with liveried attendants and all the blatant surroundings of their ilk. Secondly, there were the almost concurrent and deplorable conditions that followed the depression of the Jackson administration, during which many who had been employed in other lines proclaimed themselves dentists overnight. Obviously, most of these operators could employ only the easily manipulated amalgam, having neither the background nor the skill to acquire the exacting technic of the qualified and renowned dentists employing gold foil.

The obtrusion of unqualified operators was now such a threat to public welfare and general professional prestige

as to make the time ripe for Hayden's idea. Accordingly, August 18, 1840, a group of the most noted dentists in this country met in New York, where was accomplished the organization of the American Society of Dental Surgeons. There were two Virginians "present by invitation," F. B. Chewning, of Richmond, and S. M. Shepherd, of Petersburg. James D. McCabe was elected a member at this organization meeting.[4] S. M. Shepherd served on the original Publishing Committee of the society.

The proceedings of the American Society for the first two years, when it was the sole known dental organization, reveal the interest and activity of Virginia dentists. Especially were the two gifted McCabes in demand for "dissertations." At the first annual meeting, Philadelphia, August 10-12, 1841, Virginians elected to membership were J. W. Shepherd and John C. McCabe, of Petersburg, T. B. Hamlin, of Wytheville, and Simon P. Hullihen, of Wheeling.[5] At the second annual meeting, Boston, July 19, 1842, Virginians elected to membership were W. W. H. Thackston, of Farmville, Leroy Murrell, of Petersburg, and John G. Wayt, C. O. Baker and John McConnell, of Richmond. Though the *Journal* reports that "attendance was disappointing, owing to the remoteness of the meeting place," T. B. Hamlin had made the trek from Wytheville to far away Boston and was among the few present.[6]

Throughout the first formative years of the American Society, there was recurrent advocacy of the formation of state dental societies as auxiliary to the parent body, and finally this plan reached the floor through a prevailing resolution discussed at length by such familiar figures as S. M. Shepherd, Jahial Parmly, Amos Westcott, Edward Maynard, Chapin A. Harris and others.[7] But the earlier advocacy had found responsive ears in Virginia before formal passage of the resolution.

It was 3:30 p.m., Monday, December 12, 1842, at the office of Samuel Lethbridge, No. 8 North Thirteenth Street (the present Governor Street), Richmond, that the group who achieved the organization of the Virginia Society of Surgeon Dentists met.[8] The convention was called to order by James D. McCabe, who nominated Samuel Lethbridge to the chair. On motion of John McConnell, James D. McCabe was made secretary.

The first business of the society was the adoption of the following resolution:

> *"Resolved,* that in the opinion of this convention, the dental science would be greatly benefited and advanced, and the interests of its practitioners, and of the community at large, promoted by the formation of a state society, for the purposes of uniting the energies of the profession, to distinguish and reward merit—to discountenance and expose quackery and charlatanism; therefore, be it further
>
> *Resolved,* that a committee be appointed to report to this convention a form of constitution for the organization and government of such a society.

In pursuance of this resolution, the constitution and bylaws were prepared by W. W. H. Thackston, being adopted after slight modification. The constitution and the bylaws were those of the American Society of Dental Surgeons "modified to suit the circumstances of locality." Some of its provisions were annual dues of $3; attendance once in two years unless excused for satisfactory reasons; dropping of members after three years for non-payment of dues; issuance of certificates or diplomas for the degree of doctor of dental surgery, and the requirement of theses from candidates for the degree.

By resolution, James D. McCabe, John G. Wayt and S. M. Shepherd were "constituted a committee to apply to the Legislature of Virginia for act of incorporation of this society." On motion, the president was added to the commit-

tee and it was further instructed to obtain a proper seal for the use of the society.

James D. McCabe, John G. Wayt and R. N. Hudson were appointed a committee to address the dental profession of Virginia.

James D. McCabe was requested to deliver the address at the first annual meeting and the following were appointed to prepare essays: D. M. Coulling, R. N. Hudson, John McConnell, W. W. H. Thackston and William N. McKenney.

The society adjourned to meet in Richmond on the second Wednesday in October 1843, after election of officers with the following results: Samuel Lethbridge was made president; John G. Wayt, vice president; James D. McCabe, corresponding and recording secretary; S. M. Shepherd, treasurer, and W. W. H. Thackston, R. N. Hudson, John McConnell, T. B. Hamlin and William N. McKenney, Executive, Examining and Publishing Committee.

This, gentlemen, is our true genesis as a professional organization and the fact in no wise detracts from the glory of those who revived our present and succeeding organization in 1870. The list of those who participated in the 1842 organization should be inscribed in our records as a roll of honor:

Samuel Lethbridge, Richmond
James D. McCabe, Richmond
John C. McCabe, Richmond
R. N. Hudson, Richmond
John McConnell, Richmond
John G. Wayt, Richmond
S. M. Shepherd, Petersburg
J. W. Shepherd, Petersburg
Leroy Murrell, Petersburg
William N. McKenney, Fredericksburg
J. B. Garland, Fredericksburg
T. B. Hamlin, Wytheville
D. M. Coulling, King and Queen County
W. W. H. Thackston, Farmville
C. F. Martin, Norfolk
J. C. Birch, Charlottesville
Asa Pierce, Sussex Court House
W. C. Crump, Washington, N. C.

This organization of a state group was warmly welcomed by the American Society of Dental Surgeons, as witness an illustrative paragraph from a congratulatory editorial in the *American Journal of Dental Science:*

> We are pleased with the move that has been made to elevate the character of the profession in Virginia, and to protect its citizens against the impositions that are daily being practiced upon them by unprincipled charlatans. *We hope the example will be followed by dentists in other states.* With most of the gentlemen comprising the Virginia Society of Surgeon Dentists, we are personally acquainted and believe them to be well read and skillful practitioners. Many of them are members of the American Society of Dental Surgeons.[9]

The two resolutions adopted at this first meeting of the Virginia Society may with convenience be followed through here. The work of the committee appointed to "address the profession of Virginia" was regarded by the editor of the *Journal* as so able that it was republished in that organ.[10] It likewise is so descriptive of conditions then obtaining in dental practice as to warrant its present inclusion in a historical study.

TO THE MEMBERS OF THE DENTAL PROFESSION IN VIRGINIA:

Gentlemen—The undersigned, a committee appointed by "The Virginia Society of Surgeon Dentists," respectfully request permission to call your attention to the organization of that Society, and ask your cooperation in the furtherance of its views for the advancement of the interests of the profession in our State.

With us you have no doubt long mourned the various evils under which dental surgery has labored, occasioned by the lack of some common centre, from which should radiate the elements of a sound Dental Education, or the means of detecting quackery and charlatanism, and stamping upon merit the evidence of proper application to the roles of our art.

This long night was at length broken by the Institution of "The American Society of

Dental Surgeons." To this succeeded the Baltimore College of Dental Surgery, an institution which should receive the fostering care and support of every member of our profession. These have already done much for our art in furnishing a bond of union to those who prefer honest fame to gold and establishing a sound system of professional education. Last, but not least, the Virginia Society has entered the arena, to accomplish in our own State what has been so successfully effected North of us. What it is this last Society desires to effect will be seen by reference to the accompanying Constitution and By-Laws. Too long has our favorite science been considered a mere mechanical trade, into which every unprepared quack, acquainted with the use of small tools, might obtrude himself at pleasure. Men of high attainments in other branches of the healing art have lent themselves to this delusion, and greatly contributed to the injury of a science that ranks deservedly high, when well understood and practiced, and aids in effecting as much for the relief of human suffering as any one branch of the healing art. It is time that the virtue and intelligence of the profession in Virginia should unite to root away its reproaches, and erect a standard of qualification which will place Dental Surgery where it should be, alongside its sister sciences; Medicine and General Surgery.

The Virginia Society aims to effect in this State a consummation so desired and devoutly wished for by us all; this it hopes to do by a rigid adherence to the requisites for membership in its body, and thus unite all who respect their profession, in an effort to protect it from the unhallowed hands of the ignorant and pretending, as well as secure that professional unity and courtesy, which is so essential to the improvement and elevation of the science.

With these views to govern our undertaking, we call to our aid our professional brethren; those who may wish to unite with us will please forward their applications to the Examining Committee, or any one of them, and give us their attendance at the next annual meeting to be held in the city of Richmond the second Wednesday in October next.

James D. McCabe
John G. Wayt
R. N. Hudson

The committee appointed to apply to the Virginia Legislature for an act of incorporation obviously found what has consistently been experienced since, that legislation is a tedious process; for it was not until three years later that they achieved incorporation. But they completed their work in ample time to gain the priority of the first incorporated dental society and the further distinction of accomplishing the first dental legislation placing dental interests entirely within the hands of the profession, the only previous dental legislation (1841) providing for a dental member of a board under control of the medical profession.

A copy of the act of the Virginia Assembly is as follows.

AN ACT INCORPORATING THE VIRGINIA SOCIETY OF SURGEON DENTISTS

(Passed Feb. 3, 1845)

Whereas, Samuel Lethbridge, John G. Wayt, James D. McCabe and other citizens of the State of Virginia, have formed themselves into a Society, under the title of "the Virginia Society of Surgeon Dentists," whose objects are the promotion of dental science, the establishment of a library and cabinet of anatomical preparations, for the purposes of introducing a sound system of dental education; and it having been represented to the General Assembly, that the members of said society are desirous of obtaining a charter of incorporation, that they may with lawful protection carry out their laudable purpose. Be it therefore enacted: That the members of aforesaid Society, together with such others as shall hereafter be associated with them, and their successors, are hereby created, a body politic and corporate, by the name and style of the "Virginia Society of Surgeon Dentists," and by that name have perpetual succession, and a common seal, and may hold and dispose of lands and tenements, goods and chattels, "not exceeding twenty-five thousand dollars at any one time," and may sue and be sued, plead and be impleaded.

The said Society may also enact such constitution and by-laws, ("not repugnant to the

laws of this State and of the United States") as they may think proper, for carrying into effect the object of the institution. And may do all other acts, proper for corporate bodies to do.

The legislature reserves the right to modify or repeal this act.

This act shall be in force from the passing thereof.

I certify that the foregoing is a true copy.
George W. Munford, C.H.D.
Feb. 7—1845

One function exercised under the act that was peculiar to the Virginia Society was the conferring of the degree of doctor of dental surgery. The authority to so confer the degree may be found in the latitude granted by the Virginia Assembly to the society in enacting its constitution and by-laws under the charter.

While it seems safe to say that here is the sole instance of legal issuance of the dental degree by a dental society, it should not be presumed that the idea originated in Virginia. The American Society had this aim in mind from the outset, as evidenced by its constitution and bylaws (Art. I, Sec. 10), which designate as the concluding duty of the examining committee "to examine all such persons strictly and faithfully in relation to their qualifications to enter upon the practice of dentistry; and their certificate shall entitle the holder to receive the diploma of the Society conferring the degree of Doctor of Dental Surgery."[11] The corresponding provision in the Virginia Constitution and By-Laws (Art. I, Sec. 8) is quoted verbatim.[12]

In an attempt to legalize these aims, the American Society appointed Eleazar Parmly "Agent of the Society, to present a petition to the Legislature of the State of New York, asking for a charter, with the power of conferring the degree of Doctor of Dental Surgery."[13] But the petition was not successful as in Virginia, which accounts for the fact that the American Society was perforce content to issue a diploma lacking the degree, whereas the Virginia Society was enabled to exercise fully the function desired and sought by both.

Fortunately, one of the diplomas of the Virginia Society has been preserved. It was issued to Robert Hall Sedgwick in 1846 and is now in possession of his great-grandson, W. Stewart Sedgwick of Newark, Ohio, a descendant in an unbroken line in the profession. The wide powers assumed by the Virginia Society make its diploma an interesting item of dental history. Since the signatures and portions of the lines are illegible in photography, the diploma is fully reproduced as follows:

VIRGINIA
SOCIETY OF SURGEON DENTISTS

To all and singular to whom these Presents come, Greeting:

KNOW YE, That ....., an ingenuous man of good morals, and well instructed in the science of DENTAL SURGERY, is a Member of our Society: INSTITUTED, DECEMBER 12th, ANNO DOMINI 1842, and establishing a sound system of education in its various branches.

WE, therefore, the said SOCIETY, by unanimous vote, designate the said..... as, DOCTOR OF DENTAL SURGERY; and as such, well skilled to give advice and treat disease, in the various branches of our Art; and we permit, and order, that in virtue of this DIPLOMA, he may everywhere, and always claim to himself the benefits of this Association.

IN TESTIMONY OF WHICH, we affix our Common Seal to this Parchment, and the names of the Examining Committee, together with the attestation of our President and Secretary, subscribed.

Done in the City of Richmond, October 15th, A.D., 1846 year of Independence 70th,

W. W. H. Thackston, D.D.S.
J. W. Shepherd, D.D.S.
John McConnell, D.D.S.
Wm. C. Crump, D.D.S.
Examining Committee
John G. Wayt, President
S. M. Shepherd, Secretary
Samuel Lethbridge, D.D.S.

The Virginia Society held its first

annual meeting October 11, 1843, again in the office of Samuel Lethbridge.

In the address of James D. McCabe is found the only clue to the seal of the society which has been obtained, when he relates "The formation of the Virginia Society adds another link to the chain of improvement and reform, and as the devise of the seal you have selected indicates, the sun has at length arisen upon the old Dominion scattering the gloom of ignorance—the night of quackery and empiricism." The Committee on Seal had further duties added, to-wit: by resolution to "be, and hereby are, instructed to procure and superintend the engraving of a copper-plate diploma for the use of the Society."[14]

The Examining Committee reported to the society the name of "Dr. Solomon Angel, who had been rigidly examined on the theory and practice of Dental Surgery, and who they recommend to the membership of the Society and the degree of D.D.S."

By resolution of James D. McCabe as a token of esteem, etc., Chapin A. Harris was made an honorary member and was furnished with the society's diploma. By resolution of W. W. H. Thackston, the same honor was accorded Horace H. Hayden.

But the meeting was not all so pleasant as this accord of membership and honors would seem to indicate. In the afternoon, a committee appointed to address R. N. Hudson, recalled as a year before a founder and one of the signers of the "call to the profession," asking an explanation in relation to certain opprobrious remarks involving character before the society, made the following report:

> The Committee appointed by the Virginia Society of Surgeon Dentists to investigate certain charges alleged against Dr. R. N. Hudson, a member of said Society, beg leave to report; that having examined the testimony upon which the charges were founded, and politely and respectfully offered him an opportunity of vindicating himself, which he most rudely and abruptly declined; thereby in the opinion of the Committee tacitly acknowledging the truth of the allegations in question; in consideration of which fact, in connection with the character of the evidence adduced, the Committee beg leave to suggest the expulsion of Dr. R. N. Hudson from membership in said Society.
>
> Signed,
> W. W. H. Thackston, Chairman

Whereupon, it was resolved that the name of R. N. Hudson be stricken from the roll of members for contumacy.

This unpleasant incident is not related to exhume the ignominy that befell a hapless individual who presumably began his association with as high ideals as his fellows, but the case is of interest because it was later cited in a momentous argument in which the American and Virginian Societies became involved. The meeting adjourned to meet in Petersburg the second Wednesday of October 1844.

The second annual meeting of the Virginia Society was held in Petersburg, October 9, 1844. Noted among the proceedings were a resolution presented by James D. McCabe on the death of Horace H. Hayden and the admittance to membership by unanimous ballot of John H. Blankenship, after he was rigidly examined and passed on by the committee. The society adjourned to meet in Richmond the second Wednesday in October 1845.[15]

Throughout the period of the foregoing transactions, there were none save the two dental societies—American and Virginia—in existence, but, with many compliments indicating the amiable relationship that existed between the two groups, the American Society was urging other sections to follow the enterprise of the Virginia profession in uniting. This urging found another group ready for organization, and the Mississippi Valley Association of Dental Surgeons was formed in that year, on August 13, 1844.

The idea of component societies of a

national organization may have been achieved, so far as the development of the nation and the profession permitted, had it not been for the amalgam factor, the material that had quickened Hayden's original idea and was now to exhibit its disintegrating tendencies, not only in the human mouth, but in dental societies as well.

Despite the assertion of Chapin A. Harris in his opening address to the first class of the Baltimore College of Dental Surgery in 1840 that "amalgams of mercury and silver have nearly gone into disuse," it was actually being used more, largely by the overnight and inexperienced influx, but, in many instances, it was used occasionally by outstanding practitioners. The bitter reaction of the profession to the blatant ways of the Crawcours appears to have been translated into a blind hatred of the material itself.

As briefly as it can be told, the American Society, July 20, 1843, passed a resolution in which the use of amalgam was declared malpractice. Finding that this did not stop the use of amalgam, the society resolved to expel any member who refused to sign a certificate pledging himself not to use amalgam, and "moreover, protesting against its use, under any circumstances, in dental practice." It must not be assumed that this resolution passed without protest, for Solyman Brown and Elisha Baker,. among others, pleaded in vain for a more reasonable and tolerant course. The latter, identifiable as that same Elisha Baker who was in Richmond in 1819,[16] but now at No. 6 Warren Street, New York City, even then advised his fellows that, "Members of our Society, living in Virginia, whose state arms are represented by Liberty treading on a tyrant and his chains, and whose motto is 'Sic Semper Tyrannis,' will arouse at the least encroachment on liberty or right."[17] But the resolution passed notwithstanding, and the controlling group of the American Society proceeded without fear or favor in trials of cases looking to expulsion. It seems incredible now to read the case in hearing of such a notable as Nathan C. Keep or to note the continuance of the case of G. W. Parmly owing to his absence from the country,[18] an absence that coincides with his service as dentist to the royal family at the Hague.

The newly organized Mississippi Valley Association followed the lead of the American Society in docile fashion, for at their organization, August 1844, the resolution passed on amalgam was in short "that we will neither use it nor countenance its use by others."[19]

Naturally, the question of compliance with the resolution of the American Society came before the Virginia Society at its annual session at Richmond in October of the same year, 1845. With clear foresight and that high regard for individual rights which characterized Virginians of the period, and which fortunately exists in notable instances even today, the Virginia Society debated fully the amalgam resolution. The debates took the general tone of a declaration that the society was not a court of conscience; that they had no right to demand expression of opinion, nor to require any pledge in relation to the use of amalgam, and, further, that to expel one for refusing to express an opinion or to give a pledge was making the refusal malpractice, which was illogical and absurd. It was also observed that to require action under threat was a course of procedure to which no honorable man would submit.

The resolution as finally passed by the Virginia Society was introduced as James D. McCabe, seconded by W. W. H. Thackston, and passed with but one dissenting voice:

Resolved, that while we reprobate the use of all such mercurial preparations, and will execute our laws with fidelity and promptness, we claim no authority over the opinions of our members, nor will we ever require

of them other pledges than those which exist among honourable men, united for the purpose of improving and elevating a noble science.[20]

There was also prepared at this meeting a public notice:

The Virginia Society of Surgeon Dentists having heard that various individuals were in their professional cards publishing themselves as members of this Society and thereby obtaining credit with the public, are induced to publish a full list of all its members. The gentlemen below are the only persons by them authorized to practice Dental Surgery in Virginia.[21]

MEMBERS VIRGINIA SOCIETY
PUBLISHED IN 1845:

Samuel Lethbridge
*†John G. Wayt
*†James D. McCabe
*S. M. Shepherd
*†W. W. H. Thackston
*John McConnell
*†T. B. Hamlin
*Wm. N. McKenney, M.D.
J. B. Garland, M.D.
David M. Coulling
*Leroy Murrell
*J. W. Shepherd
W. C. Crump, M.D.
*Chas. F. Martin
John C. Birch
*†Asa Pierce
*†Benj. W. Collier
G. W. Leitch
Solomon Angel
John H. Blankenship
Abner D. Lewis

HONORARY
Chapin A. Harris
Wm. Tatum, M.D.

As further proof that they struggled with problems not unfamiliar to us may be cited the motion from the floor that the society, now 3 years old, enforce the provisions of the by-laws by dropping those members whose dues were three years unpaid.

The session adjourned to meet in Petersburg on the second Wednesday in October 1846.

History notes that the Virginia amalgam resolution was "the principal recorded act of the Virginia Society, by which it avoided one of the reefs on which its sister society went down; but how far other dangers were evaded cannot be determined as the period of its dissolution is not known.[22]

It is but natural to conjecture as to how the course of dental history may have been changed had the Virginia Society meeting preceded that of the American Society in the year in which the troublesome amalgam question beset the profession. Would the more tolerant Virginia resolution have led to an eventual workable solution of the problem? It is impossible to say in view of a determined controlling group in the American Society. In any event, the amalgam resolutions of the American Society were followed by a flood of protests against high-handed action, and the Virginia resolution was almost invariably cited in support. These protests further fired the already blind zeal of the American Society controlling group, who apparently believed the Virginia Society largely responsible for inciting the criticisms to which they were subjected in their untenable position.

Observe the change from amiable regard and complimentary tone, invariably obvious in former references to the Virginia Society, to the bitter and sarcastic vein of the current editorials of the *Journal*.

There is one resolution which we ought not to pass by in silence, as it was evidently intended as a reflection upon that part of the proceedings at the last meeting of the American Society of Dental Surgeons concerning the requirements of its members in relation to the use of mineral paste in filling teeth. Now, how the American Society will be able to survive the shock of so tremendous a rebuke, we confess we are unable to

*D. D. S. from Baltimore College Dental Surgery.

†Fellow American Society of Dental Surgeons.

imagine, nor shall we say how far the Virginia Society transcended the limits of its own legitimate sphere of action in thus indirectly preferring so grave a charge upon it. We are of the opinion, however, that the resolution was wholly uncalled for and gratuitous on the part of our Virginia brethren.

If they disapproved of the action of the American Society they should have been satisfied with the passage of a resolution declaring the use of amalgam for filling teeth malpractice.

There are some who have refused to sign the certificate, for reasons which are deserving of notice. This is the more demanded, since the chief objections alluded to are sustained and renewed by the "Virginia Society of Surgeon Dentists," in resolutions passed at their last annual meeting. . . .

We may remark that it seems to us that the honourable body have aimed their whole musketry at a *mistaken* object, or have set up an imaginary one. . . . The Virginia Society in the case of expulsion of Hudson, have given us a precedent for striking "from the roll of members" all guilty of such *contumacy*."[23]

Of course, it will be recalled that the American Society later rescinded its "pledge" resolution, but it never recovered from the wounds and bitterness engendered by its action, finally in August 1858 passing the committee report "that we deem it expedient to dissolve this Association and that it be, and hereby is, adjourned sine die." Thus ended the official character of the "amalgam war," but it was to be many years before the material was the subject of amicable discussion and scientific study.

None of the foregoing should be interpreted as glorifying the Virginia Society at the expense of the American Society group nor implying that Virginians disliked amalgam any less. S. M. Shepherd and many others had inveighed against its use, and there is every evidence of a similar and general dislike. In fact, during the debate on the subject in the Virginia Society, "It was ascertained that no member of the Society has used these preparations in his practice, unless in a few instances as experiments, and that all condemn them as a substitute for foil." In both societies were men of one purpose and aim, their difference that of policy as relating to individual rights. The differences in which they became involved is related as an important part of the story of the times.

What of the Virginia Society after the eventful year of 1845? The schism had grown too great to follow it through the pages of the *Journal,* though the transactions of 1846 are carried in that periodical as gained from a newspaper, *Petersburg Republican,* not officially from the Virginia Society. That the Virginia Society in 1846 still had high hopes and plans is attested by the passage of a resolution that it was "advisable for this Society to publish a periodical." Robert H. Sedgwick was among those elected to membership. Samuel Lethbridge still served as president and James D. McCabe, now moved to Abingdon, remained in his post as secretary.[24]

The Virginia Society adjourned to meet in Richmond in October of 1847 and, for the present, this was the last note of them that may be found.

The transactions of the successor to the American Society, the American Dental Convention (1855), list none of those Virginians so active in the two original societies. New names appear among members, such as J. G. Coates, of Roanoke, James Johnston, of Staunton, and E. G. Winchell, of Wheeling; though the original vice-president of the Virginia Society, John G. Wayt, was in attendance at Niagara Falls in 1859, when the American Dental Association was formed.

The destruction and loss of many Virginia records during the Civil War, which followed the period of our interest, may contribute to the difficulty of determining definitely whether the Virginia Society continued until the date of its

outbreak. One contemporary source is quoted in this connection to the effect that the amalgam difficulties "resulted in an interregnum which was lengthened by the Civil War; yet the society (Virginia) had not been dissolved, as has been supposed, but with the return of peace resumed its meetings."[25] Regardless of the exact date in break of continuity of existence, there remains the fact that this early group comprised the founders of organized dentistry in Virginia, and the 1870 reorganization was the "perpetual succession" as provided in the charter by the 1845 Virginia Assembly.

The recorded acts and preserved writings of this early group may be studied with gratification and with profit, for each such item reveals them as men of culture and loyalty to high ideals, the very type who would adorn any profession. Naught but admiration can be kindled by such men as the staunch John C. McCabe, with equanimity and firm assurance in the nobility of his profession, answering Parmly's plaint, made in a moment of despair, that "the mere name of dental surgeon ever did exclude its owner from refined circles of elegant hospitality," with the perfect rejoinder that "there is a preeminence to which intellect entitles its possessor—a dignity which attaches itself to mind—which will always secure to the individual of any profession respect and deference."[26]

Thus lived and wrought our organized professional fathers of the first generation. At least two succeeding generations have added their efforts, and we today strive to continue the building of McCabe's "favorite science," confident in the fruition of original aims by reason of the excellent young practitioners who yearly take their places among us. In our individual relationship to this constant professional building, truly and reverently may we join the Psalmist in his chant "For I am a stranger with Thee, and a sojourner, as all my fathers were."

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SARCOID OF THE FACE (BESNIER-BOECK [SCHAUMANN] DISEASE): REPORT OF A CASE

By Joseph Schroff,* M.D., D.D.S., New York, N. Y.

RECENTLY, I had the occasion to examine a patient in the oral surgery clinic for a swelling of the face. The swelling was diagnosed as an unusual form of sarcoidosis. Because of the paucity of reference to sarcoid in dental literature and because, to use the trite phrase, it emphasizes once again the relationship between medicine and dentistry, the case is worth citation.

REPORT OF CASE

History.—Mrs. K. P., aged 48, referred to the oral surgery department with a swelling of the right cheek of four weeks' duration, gave a history of a swelling in the right parotid gland seven months previously, the result of an injury in the midline of the head. At this time, April 1941, there was, according to the report of the Memorial Hospital, a tumor in the right parotid region that had some of the characteristics of a mixed tumor of the parotid. However, as an aspiration biopsy was said by the pathologist to show "tuberculosis of the preauricular lymph node," the patient was advised to have the node removed, but she refused. At the same time, a sialographic study was made. The swelling gradually disappeared within the next week without treatment. The patient remained perfectly well until four weeks previously, when a swelling of the right cheek developed. The swelling increased gradually to its present size. It was never painful or tender and did not interfere with mastication of food. There was no loss of weight or strength.

Examination.—A large firm irregular nontender mass occupied the region of the cheek and the parotid gland, lying within the substance of the cheek and causing a bulge both on the outside of the face and on the inside of the mouth. There was no interference with opening or closing of the mouth. The orifice of the parotid duct was obscured. The mass was approximately 2½ by 3 inches (5 cm.) in diameter.

The roentgenogram of the jaw revealed the remains of a radiopaque solution (lipiodol) within the parotid gland. A biopsy was made by excising some tissue from the mass through an incision of the mucous membrane of the cheek. The pathologic report was tuberculosis of the buccal region. The Ziehl-Neelsen stain for acid-fast bacteria was negative.

The patient was referred to the medical department for a complete examination. The report was as follows:

An obese white woman, aged 48, with local swelling of the right cheek, but no other complaints.

Head, eyes and nose negative. Pupils equal and regular. Neck negative; no masses; no palpable lymph nodes or abnormal pulsation or enlarged veins.

Thorax negative; lungs clear to percussion and auscultation; good expansion.

Heart not enlarged to percussion; sounds good, no murmurs.

Abdomen negative; no masses felt in organs.

Reflexes equal, but slightly sluggish.

Spine negative, blood pressure 130/90.

Summary of important findings: A woman, well developed and well nourished, gave a history of:

1. Painless swelling of the right side of the face, seven months previously, diagnosed as tuberculosis of the preauricular node at Memorial Hospital and which disappeared without treatment.

2. No pulmonary or other tuberculosis or contacts.

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3. Negative tuberculin tests at different times made by her local physician.

4. Negative chest roentgenogram at Memorial Hospital.

5. A painless firm swelling in the right parotid region of four weeks' duration.

6. Biopsy from cheek (10/2/41) with a diagnosis of "tuberculosis of the buccal region." A Ziehl-Neelsen stain was negative for acid-fast bacteria.

7. Negative x-ray picture of phalanges and face.

8. Absence of eye symptoms.

9. Negative urine examination.

10. Negative Klein test for syphilis.

11. Negative Mantoux (Mendel) test (1 to 100,000).

Fig. 1.—Appearance of external swelling of cheek.

Fig. 2.—Appearance of swelling within oral cavity.

Repeated x-ray examination of the chest (10/16/41) showed the apices and costophrenic angles to be clear. Both lung fields were normally radiable and the cardiac contour was not unusual.

The blood count was as follows: hemoglobin, red cells, 3,480,000; white cells, 7,500; polymorphonuclears, 64 per cent; lymphocytes, 34 per cent; eosinophils, 2 per cent.

Treatment.—The patient was treated with large amounts of arsenicals by her local physician, with the recession of the swelling. The anemia was treated with liver extracts and iron. At the present writing, she is in excellent condition with no recurrence of swelling.

The literature of medicine is replete with isolated observations of seemingly unrelated conditions that later, in the steady advance of medical knowledge, become correlated and finally woven into a true mosaic. As an example of this fact, the disease under discussion, namely sarcoidosis, is cited.

The true nature of sarcoidosis became evident with Schaumann's observations in 1914, on "lupus pernio" before the French Society of Dermatology and Syphilology. He showed that the lupus pernio first described by Besnier in 1889 as affecting the nose, ears and fingers and the sarcoid described by Boeck in 1889 as affecting the skin, mucous membrane and lymph nodes were manifestations of the same disease, and that, in addition, the condition affected the tonsil, lungs, bones and internal organs. Schaumann concluded that since the pathologic process was the same in all organs, this disease is not a skin disease but a generalized disease. Since the disease involved the lymphoid tissues, he termed it lymphogranuloma benign, to distinguish it

from Hodgkin's disease, or lymphogranuloma malignum.

The condition described by Heerfordt (1909) as "febris uveoparotidea subchronica" was later shown to be but another phase of sarcoidosis. Numerous other writers followed with observations of the process affecting the lungs, bones, heart, etc. Longcope has recently stated that sarcoidosis no longer is a medical rarity, but must be considered a generalized disease, which may affect all organs and tissues and may appear in a wide variety of chronic forms. Although a great deal of information has been accumulated, its etiology or its method of dissemination through the body is still unknown. The diagnosis is usually based on the microscopic examination of tissue, which shows the hard tubercle.

The relationship of sarcoidosis to tuberculosis is a matter of controversy. Longcope and his co-workers maintain that sarcoidosis is not a form of tuberculosis, although in some instances the patients may develop tuberculosis later, while Schaumann and his co-workers regard sarcoidosis as of a benign tuberculous nature. In their opinion, the absence of acid-test bacilli in benign lymphogranulomatous tissue is associated with a peculiar tuberculin anergy present in these cases. The bacilli can be demonstrated by special staining methods (Hallberg's *Nachtblau*).

The salient features of sarcoidosis as observed by Longcope, on the basis of thirty-one cases, are that the disease may affect any organ and is prone to affect lymphoid tissue. Fever, loss of weight, abnormalities in urinary findings and anemia are the exceptions. The blood counts, aside from an eosinophilia, are within normal limits.

Marked constitutional reactions are usually not the rule even in the acute phases of the disease. Symptoms are due primarily to mechanical interference with the function of the organ rather than to any form of intoxication. The "hard nodules," or sarcoid, when in great numbers, tend to displace or destroy normal tissue and may produce tumorlike masses involving one or more organs. When sarcoid occurs in the skin or superficial lymph nodes, little or no damage may result, but in the eye, lung, central nervous system or heart, great destruction may result.

Sarcoidosis may run a long chronic course with periods of remission and recurrence involving different organs and tissues. Because of this, the disease may present a great variety of clinical syndromes, which may be mistaken for some other specific disease, such as syphilis, tuberculosis, Hodgkin's disease, leukemia or lymphosarcoma.

Spontaneous recovery takes place in many instances. Without knowledge of the cause, all methods of treatment are entirely empirical. Various arsenicals, leprosol, tuberculin, roentgen rays, radium and ultraviolet rays have been used with equally good results.

CONCLUSION

A white woman, aged 48, presented a painless swelling involving the face. Biopsy of the mass led to a diagnosis of "tuberculosis (?) of the buccal region." The presence of lipiodol in the parotid gland somewhat complicated the diagnosis, suggesting a possible foreign body reaction.

However, the presence of tuberculosis of the preauricular node reported previously to the lipiodol injection seven months before, followed by spontaneous disappearance of the mass, recession of the present mass under arsenical therapy, negative x-ray films of the lungs, a negative tuberculin reaction, etc., strongly favors the diagnosis of sarcoid.

In the differential diagnosis of swelling of the face and jaws, sarcoidosis must now be added to the list of possible diseases to be considered by the oral surgeon.

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IMPORTANCE OF BACTERIOLOGIC TESTS IN ROOT-CANAL THERAPY

By J. FILGUEIRAS, C. D., Rio de Janeiro, Brazil

METHODS of treating root canals have been unscientific and lacking in the application of modern knowledge of bacteriology. It is not safe to depend on such signs as the character of the exudate that is to be found on absorbent points used in dressing a canal. Dependence on such clinical signs as the odor of dressings or the effervescence produced by the use of hydrogen peroxide on the dressing does not compare favorably with the use of records made in routine medical or surgical procedure.

In 1919, in the United States of America, LaRoche and Coolidge both conceived the idea of verifying the sterility of root canals by bacteriologic methods, thereby raising the standard of root-canal treatment to the scientific level of treatment employed in other medical specialties.

Those who practice root-canal treatment by means of the bacteriologic control have been convinced of the soundness of this practice, because it is not rare, with a seventy-two hour incubation period, to obtain cultures of streptococci from absorbent points removed from clean, dry and odorless root canals. It has also been observed that, frequently, absorbent points removed from root canals saturated with puslike exudate, when cultured for seventy-two hours, show no growth; which further verifies the belief that clinical symptoms are unreliable and unscientific as indications for filling root canals. In the first case, without laboratory verification, a root canal would have been filled in the presence of streptococci; while, in the second case, where the exudate was a result of some irritation from mechanical or chemical trauma, the operator might have concluded from the clinical symptoms that the condition could not be cured by treatment. Clinical symptoms would have misled the operator in each case, and

*NOTE: This paper has been edited in the translation by E. D. Coolidge to clarify certain points. It is hoped that there has been no change in the meaning that the author desired to convey. It is a very commendable paper and the technic outlined is one that is very exacting. The status of treatment of root canals will be raised to a higher level if every dentist will carefully read and ponder over this paper.

the wrong treatment would have been given if clinical symptoms alone had been followed.

The test for sterility of root canals by bacteriologic cultures should consist in not only demonstration of a growth or lack of growth of micro-organisms in the culture medium, but also a microscopic examination to determine the type of micro-organisms that may be growing in the culture. It is important to know whether the micro-organisms are saprophytic or pathogenic. Streptococci and staphylococci are usually considered pathogenic when found in root canals, while *Micrococcus catarrhalis*, diphtheroids and *Bacillus subtilis* are saprophytic micro-organisms that frequently are found in the culture. The presence of these saprophytes usually indicates contamination from an improper technic, such as a leak in the rubber dam or careless use of a disinfecting wash of the teeth included in the rubber dam, or possibly an accidental contamination in some part of the operation in inoculating the culture medium or of studying it in the laboratory. It is always necessary to give further treatment to the root canal when any cocci are found and also if saprophytic micro-organisms persist.

It is sometimes found that one or two root canals of a multirooted tooth are free from infection and the others infected. These canals can be treated independently so as not to contaminate the sterile canals. Dressings have been left in the canals from seven days to fifteen days without a delay in obtaining sterility even where streptococci had been found. We estimate that forty-eight hours is the shortest period to leave the dressing sealed in which is used for the test for growth, but we prefer to leave it a longer time before testing. The absorbent point used to collect the sample for culturing can be dry or dampened

GRAPHIC REPRESENTING RESULTS OBTAINED BY BACTERIOLOGIC TEST

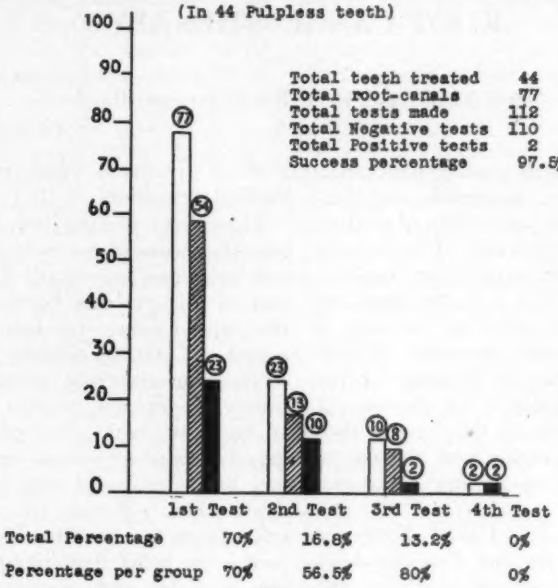

Figure 1.

with sterile salt solution, but we prefer a dry point.

METHODS OF MAKING A BACTERIOLOGIC TEST

Gualter Lutz recommends the use of ampules containing a culture medium prepared with a colored indicator. If the color of the medium does not change during three to four days of incubation, sterility is indicated.

Grossman recommends the use of brain-broth culture media. For a simple and economical incubator, he recommends a thermos bottle filled with water at a temperature of from 37° to 40° C. in which culture tubes may be suspended for seventy-two hours. Turbidity of the culture medium usually indicates a growth of micro-organisms.

A simple and easy measure is to get from a medical laboratory a sterile culture tube in which to place the collecting absorbent points, the tube then being sent back to the laboratory to be cultured. Delay in forwarding such cultures to be incubated may result in the death of the micro-organisms before they are placed in the incubator and lead to a wrong conclusion.

It is more dependable to get several tubes of culture medium, which can be kept in a safe place in the office where it is free from dust and contamination. The collecting absorbent point is taken from the root canal under a bacteriologic technic and placed at once in the culture tube containing the medium for incubation. This is more accurate than to make a smear directly from the root canal and examine it at once under the microscope, because, frequently, the material to be found in the canal is so limited that it is difficult to find the micro-organisms in the smear.

American authors recommend brain-broth, but Brazilian bacteriologists think meat broth with peptone and glucose is

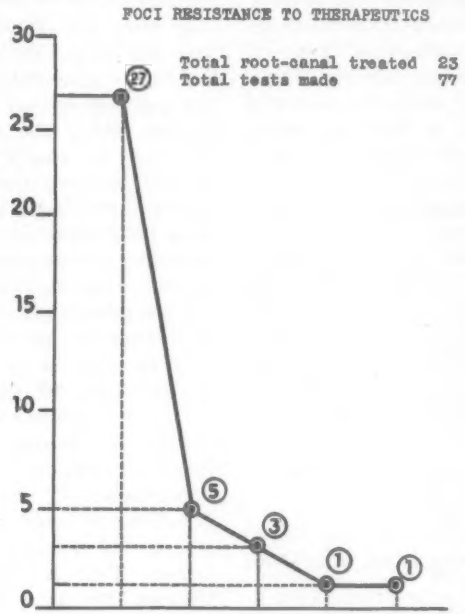

Figure 2.

more appropriate for use in tropical climates. The principal germs found in dental infections are streptococci and staphylococci, which seem to grow better in this medium. For the most accurate test for sterility of root canals, three cultures should be made which show no growth, with only a dressing of sterile saline solution employed between the culture tests.

TECHNICAL PROCEDURE

When, according to the clinical signs, the root canal is ready to be filled, regardless of the medication that was used in treatment of the case, the culture test is necessary to prove the sterility of the canal. We use the following instruments and materials to make this test:

Atomizer.

Rubber dam, clamps, silk floss, rubber dam holders and punch.

Small metal dish to carry absorbent points, compresses, syringes, needles and other instruments.

Metal tray, fire-proof, for instruments after they have been used.

Two cotton-pliers, one for the operating field, another to remove points and compresses from their holders.

Mouth mirror.

Two glass syringes, Luer's type 2-3 cm.

Two needles: 3 by 0.6, slightly bent.

Small pair of scissors.

Explorer No. 3.

Excavators and spatulas for gutta-percha and cement.

Gas burner or alcohol lamp.

Small metal drum (12 by 6 cm.) containing small compresses (0.5 by 0.5 cm.) of compressed cellulose sterilized at 270° F. for thirty minutes.

Absorbent points, "thick."

One sterilized glass jar to receive these points.

Test-tubes with culture broth.

Metaphen tincture or similar germicide.

Absolute alcohol to wash the root canal.

Alcohol 40° for flaming the instruments.

Temporary cement.

Gutta-percha, medium and hard.

Antiseptic solution for atomization.

Ampules of sterile saline solution.

STEPS OF THE TECHNIC

1. At the last appointment, after the root canal is considered ready to be filled, we clean the root canal as well as possible with absolute alcohol, using the Luer syringe with needle slightly bent, and dry it with absorbent points and compresses. One absorbent point free from drugs or medicaments is left in the root canal; the pulp chamber is filled with a sterilized compress, and the tooth is sealed with temporary cement and gutta-percha.

2. After forty-eight hours, never before this time, the mouth should be thoroughly atomized, the operating field sprayed with diluted hydrogen peroxide and the rubber dam adjusted accurately. Antisepsis is assured for the dam and isolated teeth by the use of metaphen tincture or a similar germicide. Hot air is used to dry out the excess of germicide, and then the dressing is removed with sterile excavators. It is necessary to carry out this operation with the greatest care, with attention to the smallest details, even avoiding an air draft. We recommend cutting off the electric fan and closing the windows to prevent contamination of test-tubes, keeping in mind that no antiseptic is to be used during the operation.

3. Once the gutta-percha has been removed, the temporary cement must be broken. Then hot air may be used for cleaning the field and removing the pellet that carries the cement débris. The field is then cleaned for the passage of the absorbent point for the culture.

4. As soon as the point is ready to be removed, the assistant brings the culture tube previously labeled with the name, date, hour and indication of the canal (one tube for each root canal), and the operator removes the point with pliers, using great care not to touch the cavity walls or any other thing. Immediately afterwards, the cotton stopper is inserted in the test-tube, which is sent to the laboratory. This should be done quickly so

that the tube will be open only for the shortest period of time and the point will be exposed to the air for just a fraction of a minute. It is necessary to have a little training to do this correctly. While the result of the bacteriologic test is awaited, the dressing must be antiseptic. If bacteriologic examination reveals the presence of pathogenic germs, one or more treatments with medication or other procedures (ionization, compression, etc.) should be made. Again, after washing of the root canal with alcohol and a sterile saline solution, another dry sterile absorbent point is sealed in. Always the third examination must be final. If infectious conditions persist after the third test, the tooth must be extracted.

In case only saprophytes develop, it is necessary to have another laboratory test. When this test indicates the association of saprophytes and pathogenic organisms, the same procedure should be used, in trying to correct the defect that caused the contamination.

It is important to know the length of time that the saprophytes take to grow in the culture medium, and whether the organisms are exclusively saprophytic, because, if they do not develop in the first twenty-four hours of incubation, the test may be worthless, as they may stop, by competition, the development of pathogenic germs.

A sterility test of a root canal, therefore, must be made systematically in all cases. This proof, like all laboratory proofs (Wassermann, Kahn, Schick, hemoculture, etc.), when negative, may have no value at all. It should be made plain that sterility does not mean cure. Cure is dependent on the patient's good health. The sterility test is used only as an indicator as to when to stop the treatment and fill the canal. It is an indicator of scientific value, but has nothing to do with therapeutics. It is proper to expect that the root canal treated under these directions and thus filled will afford a favorable prognosis.

We have had an opportunity to test the sterility of the material taken from the apex and socket of an extracted tooth a month after the filling had been done. This tooth, during treatment, furnished two positive cultures of streptococcus, and sterility was obtained only on the third test.

The data gathered from forty-four pulpless teeth treated by this method, after careful selection, are shown in Figure 1.

In cases in which we could not obtain sterility the first time, twenty-three of seventy-seven, we could verify the presence of the streptococcus as the prevailing agent in the periapical infection. (Fig. 2.)

Unfortunately, it has not been easy to establish the exact connection between methods of treatment and the results.

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COMPLETE DENTURE IMPRESSION MATERIALS
THEIR APPLICATION AND MANIPULATION

By HENRY GLUPKER,* D.D.S., Chicago, Ill.

UNQUESTIONABLY, many of the difficulties encountered in complete denture prosthesis have their beginning in the impression phase of the construction of artificial dentures. There is, apparently, an unending search for a technic that will prove infallible regardless of its use or abuse. Yet, peculiar as it may seem, most of the approved technics, when properly applied, will, in some hands, prove decidedly satisfactory. The success of these individual operators should not be attributed to unusual ability. In all probability, it may be attributed to an understanding of mouth conditions which require a variation in the selection and application of the various impression materials.

Usually, this phase of denture construction is discussed from the viewpoint of manipulation of materials rather than consideration of the application of the materials as required by the physical conditions of the oral tissues. In the past, it seems that little consideration was given to the characteristics of the tissues upon which the artificial denture base is to rest. Since the publication of recent investigations by Pendleton, in regard to the minute anatomy of the edentulous jaws, it has been possible to formulate a more scientific plan for the application of impression materials.

The statement of Swenson regarding success in artificial denture construction is apropos and applicable to this presentation:

> The acceptance of a certain combination of methods and materials known as a technic is not necessarily a solution of the denture problem. Achieving success requires knowledge of and experience in the application of the materials and methods that have been chosen. Too many men want the mere acceptance of a technic to secure immediate results.

With the technic of complete denture construction developed to the point at which it is today, the solution lies not in the discovery of new methods or new materials, but rather in the proper application of those with which we are already familiar.

The problem of the selection of an impression technic, which of course includes methods and materials, may become very confusing unless some fundamental basis for this selection is followed. The basis for this selection will never be found in the ease of manipulation of the impression material or the unwarranted claims made for an individual product, but only in an understanding of the histologic structures which support the artificial denture.

Pendleton states in regard to impression technics: "The biologic problems usually do not enter the picture in the operator's interest until all of the alluring technics have added their quota of disappointments."

An impression is a negative likeness of the denture areas of the edentulous ridge, secured in a plastic material from which a cast can be produced.

There are four requirements of a good

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impression for the construction of a complete artificial denture:

1. It shall reproduce in detail the denture areas of the residual ridge.

2. It shall cover all the area intended to be included in the completed denture base.

3. The peripheral borders shall be well-rounded and shall fill the vestibular space.

4. There shall be definite control of the soft tissues comprising the denture areas of retention.

My remarks will be confined primarily to consideration of the fourth requisite, control of the soft tissues.

George H. Wilson has given us many basic principles of impression technic, two having a direct bearing upon the selection of impression materials: "An impression material is of value only as it is intelligently and skilfully used . . . the soft tissues are the factors that create the variableness in impression taking."

Control of the soft tissues is of great importance, and yet is probably the procedure least understood, primarily because of lack of knowledge of the research in this particular field.

For many years, clinical observation has proved that certain materials give a decidedly satisfactory result from the viewpoint of retention and maintenance of the health of the tissues of the denture areas, while, in other cases, the results were none too gratifying. The conclusion was reached that there were definite indications for the use of various impression materials and that the soft tissues of the edentulous ridge, and especially the tissues receiving the principal stress from the denture base, should determine the selection of the impression materials.

Therefore, it is essential that the minute anatomy of the edentulous maxillae and mandible be considered before practical application of the selection and manipulation of the impression materials.

Pendleton has classified and described the denture areas of the maxillary edentulous ridge as follows:

1. The relief areas, located in the vault of the maxillary jaws. They are three:

(a) The median raphe, or ridge, of the intermaxillary suture, an area in the average mouth having a thin unyielding mucosa and submucosa. Undue pressure should not be placed upon this area, yet the denture base should be in contact with this area if the maximum of retention is to be secured. Relief over this area should be secured in the impression and not in the processing of the finished denture base.

(b) The incisive foramen, lingually from the incisal papilla, through which the blood and nerves of the soft tissues of the anterior lingual area of the hard palate are supplied.

(c) The posterior palatine foramina, just lingually from the position originally occupied by the second molar tooth, through which the blood and nerves of the soft tissues of the posterior two-thirds of the hard palate are supplied. Since the tissues covering these foramina are composed of fat, glandular and fibrous connective tissue, they afford protection to the blood vessels and nerves. Therefore, only in unusual conditions, a very thin mucosa and submucosa, need they be considered as relief areas.

2. The stress-bearing area, the denture area beginning at the line of muscle attachment on the buccal and labial surfaces of the edentulous ridge and extending over the crest of the ridge, including all of the hard palate except the areas of relief. The soft tissues of this area are not only variable as to thickness and compressibility in the mouths of different patients, but also they vary in thickness in the different regions of the same edentulous jaw. Their compressibility may be determined very easily by a careful digital examination of the edentulous ridge. From this examina-

tion, the compressibility of the soft tissues may be described as normal or average, non-compressible or thin and unyielding, and displaceable.

3. The valve-producing area, an area about the entire peripheral area of the edentulous ridge, composed of muscle tissue. The tissues of this area are not capable of tolerating compression, with the exception of the soft palate. The valve-producing area begins at the line of muscle attachment of the buccal, labial and posterior border and extends onto the muscles, to the flexion line.

The denture areas of the mandibular edentulous ridge are likewise three:

1. The stress-bearing area, the area over the crest of the residual ridge. The tissues overlying the jaw ridge in this area are compressible and, in most cases, capable of bearing the major stresses of occlusion.

2. The valve-producing area, including all of the peripheral tissues (musculature) similar to those of the maxillary edentulous ridge.

3. The relief area, an area on the buccal surface over the external oblique ridge and attachment of the buccinator muscle. The muscle plays an important rôle in the retention of the mandibular denture and only through freedom of contact of the denture base with the underlying tissues is stability assured.

To establish equilibrium of the denture base with these supporting structures, compression of the soft tissues of valve and relief areas must be avoided. Impairment of the health of the structures can frequently be attributed to failure to obtain and maintain denture equilibrium. In the average mouth, the tissues of the stress-bearing area must be compressed in order to secure the maximum of retention and to maintain tissue health.

All complete denture impression technics can be classified under one of the three following groups:

1. A mass impression employing plaster of Paris.

2. A mass impression employing impression compound, either in an open or in a closed mouth technic.

3. A corrective type of impression employing an individual tray of compound, vulcanite, acrylic or metal and a corrective lining. The choice of these corrective materials can, in most instances, be left to the individual operator's judgment as to his ability to manipulate the material. Among these corrective materials may be mentioned plaster of Paris, low-fusing compounds, oil impression pastes, waxes and many trade preparations. The most difficult material for use as a corrective lining is one that is slow setting, since improper digital pressure upon the individual tray while the material is hardening may cause distortion, resulting in an inaccurate impression.

Since the soft tissues are the variable factors in impression taking, examination of the tissues of the stress-bearing area will cause us to decide upon the use of the proper material. It has long been our plan to employ full plaster impressions for those ridges presenting an unusual amount of hyperplastic (displaceable) tissue in the stress-bearing area. The surgical removal of this displaceable tissue is usually indicated, yet, in certain cases (the older patient or one in poor health), this may not be practical.

In cases presenting a thin mucosa and submucosa in the stress-bearing area and relief areas, the use of impression compound as a mass impression has proved very satisfactory. The employment of impression compound will secure the greatest amount of compression and yet maintain the health of the underlying tissues. The greatest danger in the use of compound *en masse* lies in the fact that overcompression of the tissues of the valve area may occur, resulting in a loss of elasticity of the muscle fibers of this area and therefore a loss of retention of the denture base in a short period of time.

The vast majority of edentulous ridges

present a variation of hard and soft tissue areas, the tissues being slightly compressible in the stress-bearing area and not compressible in the relief and valve areas. For our purpose, the use of a compound individual tray and correction with plaster of Paris have proved very satisfactory for securing the maxillary impression. However, the use of an individual vulcanite or clear acrylic tray with a high fusing or Asiatic paraffin lining is recommended for securing the mandibular impression.

The purposes of an individual impression tray are as follows:

1. To act as a vehicle for carrying the corrective material.
2. To control the extension and development of the peripheral borders of the impression.
3. To avoid compression in the relief and valve areas.
4. To gain compression of the tissues of the stress-bearing and postdam area.

SELECTION OF THE MAXILLARY METAL TRAY

A Brittania metal tray of new design corresponding to the square, tapering or ovoid arch type is selected. The tray should be slightly larger than the edentulous ridge to allow for sufficient thickness of impression tray compound. The hole in the vault of the metal tray in the area of the ridge of the intermaxillary suture allows the escape of the compound in this area and thus affords automatic relief in the completed impression. This relief in the impression eliminates the necessity for relief on the cast during the processing of the denture base. The rims of the metal tray are short and therefore there is a minimum of displacement of the peripheral tissues.

High-fusing impression tray compound is selected to secure the maxillary initial impression, because it will harden quickly and will not become distorted when trimmed with a knife. Approximately 1½ cakes of this compound are placed in water at a temperature of 175° F. It is thoroughly manipulated to a uniform plasticity, carefully adapted to the metal tray and inserted in the mouth. The anterior portion should be carefully centered and only partially seated. While pressure is uniformly applied to the molar areas of the tray, the patient is asked to close the mouth partially to prevent underextension on the buccal and labial rims. The impression is easily dislodged by distention of the patient's cheeks by the operator. It should never be dislodged by force upon the handle of the metal tray since such a procedure distorts the compound. The initial impression must be thoroughly chilled before any attempt is made to trim it with a knife.

The rims of the initial impression are usually found to be overextended. To prevent this condition from being reproduced in the completed denture base, it is necessary to remove the excess by trimming with a knife. This trimming will also provide for complete freedom of action of the muscles in securing the plaster correction. The maxillary individual tray should always be removed from the metal tray and the peripheral borders be reduced in thickness so that the correct thickness may be established with the corrective material as determined by the vestibular space.

The corrective material of choice for lining the compound individual tray is best determined by the operator's ability to manipulate the various materials that are available. A material softened by heat is not satisfactory, since the compound, being unsupported, can easily become distorted. Orlopp's plaster has proved very satisfactory. Approximately 3 ounces of this plaster is placed in a clean, dry plaster bowl and 2 ounces of room temperature tap water is added. This is allowed to blend for one minute. The bowl is then covered and the mix agitated for thirty seconds. Two minutes of working time, sufficient to place the plaster in the tray, is available and the

plaster will set in three minutes after insertion in the mouth.

The manipulation of the compound for the mandibular initial impression is similar to that required for the maxillary impression.

IMPORTANCE OF SYSTEMATIZED PROPHYLAXIS AND ITS RELATION TO DENTAL REPLACEMENTS

By ELBERT J. WEAVER, D.D.S., Milwaukee, Wis.

IT is difficult to understand the rather casual manner in which prophylaxis is or has been taught. I have interviewed a great many recent graduates, and their indifference to and disinterest in this important phase of dentistry is amazing. There are probably a number in this group who have had amusing experiences in questioning young graduates about how they would proceed to administer a prophylactic treatment. The stock answer given to me is, "Why, I pick off some tartar if I see any, and brush the teeth a little." One young man, I recall, could remember that teeth decay at or directly under the contact points, but he could not think, with that in mind, just where it was more important to clean and polish them. Others casually answered that they were dentists, and that that kind of work was for the hygienist, leaving the impression that prophylaxis was a little beneath their dignity as big-time dentists. In some instances, a few years' experience seemed to change their outlook, but in a great many cases it did not.

Members of this section know well that there are thousands of serious cases of decay and pyorrhea that could easily have been prevented with timely, ordinarily good cleaning. This is not news to the man specializing in periodontia, or to one who, with his other work, makes it his business to give better prophylactic service than his neighbor. But the question is, "How are we, the men vitally interested in this all-important preventive work, to arouse the interest of the great number of men in our profession who make no effort at all at ordinary cleaning, to say nothing of thorough prophylaxis?"

Perhaps more than thirty years of watching day after day these cases showing conditions that should not have been allowed to occur has made me look a little too much on the dark side; but I wish that I knew more about the reactions of other men in this field—what runs through their minds when a patient announces, "My dentist thinks I have a touch of pyorrhea." It is not necessary to state what the specialist usually finds on careful examination of such cases. A record of the number of times the statement just referred to has been heard in our offices would be interesting. Upon examination, in these instances, if most of the teeth were moving like wheat in the wind, it was, of course, our duty to advise what should be done. That is

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what the dentist who was in charge could not bring himself to do, and so passed the responsibility on to some one else. Did he console himself with the thought, "If I had only suspected earlier the condition developing in this mouth, I might have done something about it"? If so, and if he was honest with himself, he probably wondered, "Well, just what could I have done about it anyway?" Fortunately, in some instances, the dentist in charge, realizing that he had failed in his care, sends the patient to some one competent to take charge. Such an attitude is very creditable.

Now as to the question of the hygienist: She certainly has her place in dental practice. She is invaluable in institutional work and in schools and educational activities, and can fill advantageously positions in certain phases of office routine. But long years in this work have taught me that prophylactic care of the mouth is as much a postgraduate requirement in dentistry as is prosthodontia, orthodontia or surgical care of pyorrhea. Certainly it seems that the man in charge of the office should be held responsible for all work done under him. This would mean that the hygienist could not be held responsible for unsatisfactory work, as she is sometimes.

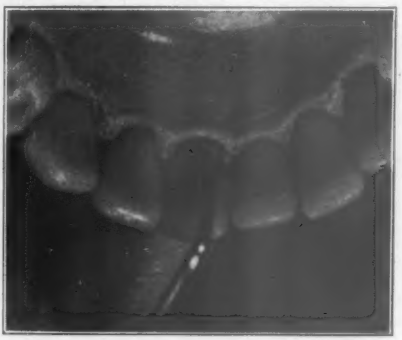


Fig. 1.—Close-up of instrument 2 (compare Figure 5), working parallel to long axis of tooth, but only on distal surfaces.

Fig. 2.—Close-up of instrument 3 or 4, working from distal toward mesial aspect; showing blade in position on tooth nearly parallel to long axis.

The foregoing comments and reflections represent the impressions that have been made on my mind during a period of more than thirty-five years—a period devoted to specialization in prophylaxis and the treatment of abnormal conditions of the periodontium. Through these years, the fact of greatest importance in the fight for good teeth and health has been the establishment of a first line of defense against disease. This first line of defense must be prophylaxis and diet.

One of the main reasons why prophylaxis is neglected by the average dentist is his fear of not receiving an adequate fee for this type of work. But is this attitude really justified? Before analyzing this consideration, let us review briefly some of the other reasons why prophylaxis is neglected today. In the first place, the average dentist feels unable to employ a sufficiently convincing type of salesmanship to impress his patients with the importance of continuous prophylactic care. For instance, let us assume that a general practitioner decides to give something better in the way of prophylactic service than he has been giving. Accordingly, when the next patient in need of prophylactic service comes in, the dentist advises a procedure for which his fee will be twice what it has been his usual custom to charge. Naturally the patient will

want to know just why, and what he intends to do that he did not do before. If the operator has taken postgraduate training and has learned or acquired a systematized technic since his last treatment of this patient, he will be in a position to explain his reasons for a new emphasis upon the importance of prophylaxis. If the patient is shown the different steps in the new technic as the work proceeds, he will, in nine cases out of ten, become interested and will be quick to note the definite superiority of the new procedure.

If the operator fails to change his technic and proceeds in the same old manner, simply spending more time, he cannot expect to secure the complete

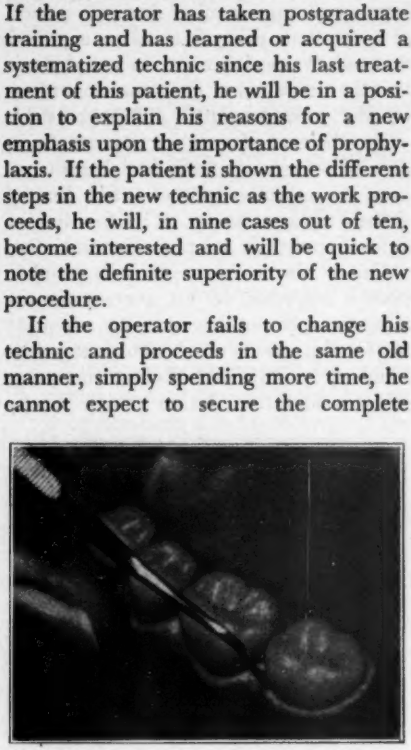


Fig. 3.—Close-up of instrument 5 or 6, working as in Figure 2, only from mesial toward distal aspect.

confidence of his patient. The patient may be somewhat impressed, but not nearly so favorably as if an entirely new mode of procedure had been employed.

The important thing that the dentist is attempting to impress upon the patient is that, with the improved technic of prophylaxis, general health and the retention of sound teeth can be guaranteed within reason. This must be thoroughly explained to the patient.

In presenting this idea, one might employ a passive or a negative type of salesmanship. Instead of strongly urging the patient to agree to the new treatment, it might be better simply to explain just what the earlier procedure consisted of, indicating its limited benefits, and then to explain the added benefits of the new technic, indicating fully its permanent results. This confronts the patient with the necessity of making a decision. In such circumstances, it is human nature to want the best when one understands its advantages. To those who have never used this idea, it is worth a trial. Our records through the years show that it has proved successful, unless the patient positively could not afford it.

Again, prophylaxis is neglected because some dentists do not care about "cleaning teeth," so-called. They have the idea that such work is not dentistry. No doubt, if these men were shown that they could

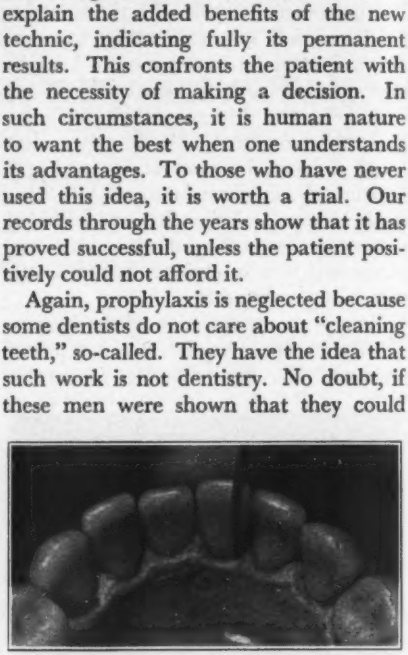


Fig. 4.—Close-up of instrument 10 or 11 (Logan files), finishing or burnishing all around gingival surfaces.

earn as much with this type of work as in other dental operations, and without much outlay for material, they might at least consider the idea.

A third reason for neglect of prophylaxis is the fact that some men are too easily discouraged if patients do not respond promptly and regularly to call cards sent out or phone calls made at regular intervals for prophylactic treatment. It is here admitted that getting the patient to come in when he should is not easy. But, in the long run, the percentage is fairly good. One thing the records show is that it is most difficult to get those who first came in with the worst of mouth conditions, due to their own or the neglect of the dentist in charge, to

return for prophylactic care. When it is discovered by the patient that he has less dental work after prophylactic care, which means less expense, and when he also finds that little discomfort is experienced after a prophylactic treatment and that no pyorrhea symptoms are allowed to develop as the years go by, the sensible patient is usually convinced of its worth.

To return to the economic or financial reason for disinterest in prophylaxis: Most dentists would qualify and equip themselves to do regular prophylactic work if they were sure that a better fee would result from the expenditure of more time and from greater efforts. But this will not happen until the dentist fully realizes the value of what he is doing. He must believe in it himself. Then when he realizes that he must get as much per hour for time spent in doing prophylactic work as he does for any other dental operation, he should be able to make the patient see the real value of preventive measures.

Leaving the economic reason for neglect on the part of the dentist, we must consider the subject from the patient's standpoint. As has been stated, it has been demonstrated innumerable times that patients will prefer more thorough prophylactic care if the value of such improved methods has been proved to their satisfaction. Don't many mouths show that at various times very good dental care has been given them, but this dental work is presenting signs of disintegration from neglect somewhere? This careful work could have been made useful to the patient for many more years if the proper health of the periodontium had been maintained. If the necessity of insuring strong abutments was stressed to the degree that "beautiful" dental work is, many more years of usefulness of dental work as well as the continuance of a good appearance could be guaranteed. The economic value to the patient can be proved by records, and the film and table clinic will show this in cases taken from our own records.

PROPHYLAXIS AND DENTAL REPLACEMENTS

The title of this paper precludes study of engineering problems from the standpoint of functional stress or stabilization. Also, different ideas as to design in the matter of clasps or other retainers, or occlusal rests, cannot be considered. By and large, this is the problem that must confront the actual builder, or more especially the designer, who I hope is more often the dentist than the laboratory technician.

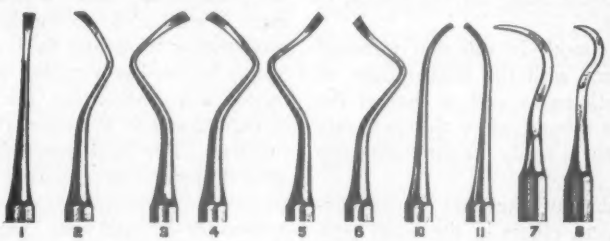


Fig. 5.—Prophylactic instruments, including Weaver push and pull (1 to 6), Logan files 10 and 11, and any thin sickle scaler of choice.

It seems that the most practical approach in illustrating or visualizing the connection between prophylaxis and replacement work would be to carry through a practical case. Let us take, for example, a case that has been in our hands for a number of years. A few years ago, a replacement was needed when some mild pyorrhea operation was carried out, but, for some reason, the case

has drifted along, or perhaps the question of removing a pulpless tooth that the patient insisted upon keeping has finally come to be a vital question.

Prophylaxis has very much to do with pulpless teeth, and we cannot leave the subject without noting what experience has taught, that it is a good procedure, if the patient wishes to retain pulpless teeth, to ask whether he does not think it advisable to consult his physician as to whether it would be reasonably safe to do so. In this way, the patient often gets a needed check-up, and whether the teeth in question are kept or not, both patient and physician may thank the dentist later on. At all events, it places the responsibility on the physician or the patient, or both, and with the notation on the examination or record card, there is one less thing for the dentist to worry about.

With the tooth in question removed in accordance with the final opinion of the diagnostician as well as that of the dentist, the mouth, after the necessary lapse of time, is ready for the removable appliance.

The history of the case under consideration, and others in the same category, has been that after the initial pyorrhea operation and the follow-up stimulation treatments, which I considered to be as important as the surgical work itself, the patient returns every four months during the first year for prophylaxis and a check-up. After that, a prophylaxis and check-up are necessary only every six months. This operation is as previously described a systematized prophylaxis, the operator looking carefully for any symptoms of gingival inflammation or deepening of the free marginal crevices. Further, if any small areas look abnormal they are slightly cauterized with phenolsulfonic acid, always followed by sodium bicarbonate, or something of that nature, until the areas are again firm and natural in color. Treatment by means of rubber pointed interdental stimulators is used, also wood polishing when necessary. Last but not least, the occlusion is checked with thin carbon paper or thin sheet wax about 26-gage, or by painting the occlusal surfaces with some color solution. To assure detection of any traumatism, the digital test is employed, placing the index finger gently against each tooth and asking the patient to move the mandible in its several excursions. The slightest abnormal movement is easily detected in this manner. Any teeth showing traumatism must be relieved, and the intent is not to take the tooth or teeth actually out of occlusion, but to relieve any side thrust, especially in the lateral excursions of the mandible.

The time has now arrived for construction of the partial denture. After the prophylaxis, during which each abutment is studied as to the health of the surrounding tissue and the bone strength, a snap impression is made, upon which is based, in a general way, the program of construction and retention that is to be followed. The final impression is made, after deepening or preparing the occlusal surface of natural teeth or inlays or crowns for occlusal rests. Experience has taught that this also is an important step. So many cases show that if the occlusal rest had fulfilled its intended purpose, the need for prophylactic care of the tissue around these abutment teeth would have been minimized. In some cases, owing to faulty rests, it is impossible to keep the areas directly adjacent to these abutment teeth healthy, and the replacement has to be remade, or loss of the teeth will result, and the greatest fault seems to be that the seat for this rest after preparation is not left so that the rest itself may be absolutely or nearly at right angles to its upright supporting pillar. Often, even where the rests are holding, inflammation will occur upon the gum tissues, directly adjacent to the abutment tooth where the partial denture seems to be exerting too

much pressure. This trouble can be remedied by making the interproximal space wider between the abutment and the denture. Also, inflammation from overextension of saddles and pressure from excessive occlusal force on partial dentures, mainly tissue borne, must be carefully watched.

From the master model taken from the final impression, the working or casting model is usually made, upon which the waxing is done and the teeth are assembled in occlusion. We must now leave these phases of construction and prepare the denture for insertion in the mouth. If the partial denture can be seated readily on the master model, usually insertion in the mouth will not be difficult. Care must be taken if more relief is necessary. The more that is known about fitting the castings on the master model, the easier the work of placement in the mouth. It is wise not to have the retention too strong at the first insertion—just strong enough for good stabilization. This gives the denture a chance to settle more readily to the exact resting place. Later, a little tightening will not place so much strain on the teeth affording the retention.

Now the occlusion is checked in the manner before stated. If the replaced teeth strike too hard, or the occlusal rests are a little high, they are relieved carefully, but the patient is advised that, in a day or two, adjustment should be made, if necessary, to further perfect the occlusion.

Whether the denture will prove successful over the length of time that it should will depend upon, first, the engineering; second, the attention to small details in construction, and, finally, the prophylactic care, with all that this implies, as the years go by. While prophylaxis is being carried out, it is well to immerse the partial appliance in a cleansing, sterilizing solution. After immersion, the denture is polished and presented again to the patient.

Just a word about fixed bridgework: After observing fixed bridgework and doing prophylactic work in mouths carrying this type of prosthesis for more than forty years I favor it where it can be used. It is desirable, however, that these dentures be built in the dental office rather than in the commercial laboratory. The only suggestion offered is that there be ample interproximal space, especially next to the abutment teeth, so that these areas may be absolutely self-cleansing. In my experience, with bridgework properly constructed, supporting areas can be kept just as clean as when a full complement of teeth are present.

CONCLUSIONS

Prostheses are as good, as, but no better than, the teeth to which they are attached or upon which they rest. And to guarantee their longevity, teeth holding or supporting these dentures should be made healthy. Prophylaxis at regular intervals must be insisted upon, and this service must include systematized instrumentation and follow-up stimulating treatments. Careful checking of occlusion whenever a prophylactic treatment is given is imperative. Instructions in brushing and in the use of floss and interdental stimulation, of course, are given.

Bankers Building.

EVALUATION OF ACRYLICS FOR MASTICATORY-SURFACE RESTORATIONS

By JACOB A. SAFFIR, D.D.S., Chicago, Ill.

FOR several years, the eye of the dentist has been delighted with the esthetic results obtained in dentures of polymerized methyl methacrylate, popularly called acrylic. More recently, the material has been advocated by some clinicians for artificial teeth, bridges, porcelain jackets and inlays. In most of the literature on this phase of the subject, however, it has been urged that the acrylics be used with caution.

It is the object of this paper to present some data which may help the dentist to approach the problem of whether an acrylic is suitable for replacements where the masticatory forces will act directly on it.

Years ago, when mile-long bridges were still a dream, the most visionary engineers supported the theory that there need be no question as to the collapse of such a bridge under operation if it were constructed of material with the required physical properties for withstanding the known strains to be put upon it.

They knew that all matter had definite and dependable properties, and that the physical properties of a given piece of matter could not be influenced by wishing. Painting a piece of wood the color of steel would not bestow upon the wood the hardness of steel. Where certain stress would be exerted, only steel would serve without breaking down.

So it is with the materials used in dentistry. They have definite physical properties which can be ascertained and measured.

There are also some fairly well-recognized minimum physical requirements that dental materials are expected to meet in order to serve without disintegration or injury to the patient. Some of these are set up by the American Dental Association's Research Fellowship established at the National Bureau of Standards at Washington. Others are evolved by experience and incorporated in some of the texts on dental materials. Thus it happens that were a new type of amalgam to be offered the dentist tomorrow, he would not have to wait five or ten years to see whether his filling stood up in the mouth. The laboratory reports of the physical properties of this new material would tell him in advance how strong it was, how hard, how brittle, how soluble, how toxic, etc. With all this knowledge before him, he would be able to judge the value of this material for specific dental purposes.

While methyl methacrylate has been a common commercial product with limited uses, in the hands of the dentist it is only a new, better looking denture material about whose chemical properties he may know little.

To extend the use of this material, acrylic, to teeth, fillings and other masticatory replacements requires study of the laboratory reports on the physical properties of acrylics and their consideration in the light of recognized minimum requirements for dental materials which must undergo chewing stress.

HARDNESS

If a material met all the requirements and had all the other physical properties desirable, but lacked hardness, it would be useless. It would have the same value as a piece of properly colored wax such

as is used by undertakers to simulate natural teeth.

In the testing of dental materials, the Brinell tester is used. A hard steel ball of given diameter is pressed, under a specific load, against the material to be tested. The area of the surface of indentation divided by the load gives the Brinell hardness number. The lower the number, the softer the material. The Brinell hardness of acrylic[1] is from 18 to 20.

Now, let us see what is considered a satisfactory hardness for a restoration material and how an acrylic fares by comparison. As a result of their work on golds, the Research Commission at the National Bureau of Standards issued Specification No. 5,[2] which lists three types of gold alloys to be used primarily for inlays. Type A, the softest, is described as for "soft inlays, easily burnished and subject to *very slight stress.*" For such light stress, the commission considers a Brinell hardness of 40 the absolute minimum.

By no stretch of the imagination could it be taken to imply that such a Brinell hardness would be suitable for an artificial tooth. For pontics, the Research Commission suggests the use of type B, with a Brinell hardness of from 70 to 100, or type C, with a Brinell hardness of from 90 to 140.

The property of hardness cannot be stressed too strongly. A good example of a material that was abandoned because of a lack of this quality is cast pure gold. With the exception of its use as a foil, where pure gold may attain the Brinell hardness of 61,[3] it is interesting to note how many authorities caution against its use.

To cite a few instances: K. W. Ray[4] says, "Pure gold is too soft and weak for most purposes and must be alloyed with other metals to increase its strength, elasticity and hardness."

E. W. Skinner[5] says, "Because of its extreme softness, pure gold is not indicated for use in the mouth except in the form of gold foil."

After a series of tests, R. L. Coleman[3] gives 24-carat cast gold a Brinell hardness of 27. Other authors[5] give it up to 34.

The average well-inserted amalgam has a Brinell hardness of 52, or more than two times the maximum hardness of acrylics.

Again it is stated that the Brinell hardness of acrylics is from 18 to 20.

STABILITY

It is almost mandatory that, after completion, an artificial tooth, bridge, jacket or inlay be stable and undergo no further change. It seems reasonable to expect a material going into such important precision work to remain constant once it is processed.

Unfortunately for dentistry, acrylics are shown to undergo constant change.

W. R. Kern[6] performed some ingenious experiments with acrylic, vinyl acrylic and vulcanite which present these changes in a simple, understandable manner. He says:

> Under conditions of moisture and temperature simulating those of the mouth, all materials showed dimensional changes ranging from +0.32 per cent to −0.04 per cent by measurement from left to right and from +0.94 per cent to −0.49 per cent in depth of vault by measurements averaged over a period of twenty-four weeks after processing. Changes after processing indicate a general expansion of all materials except vulcanite, which showed contraction. . . .
>
> That the dimensional changes which occur after processing may be influenced by the release of strains resulting in warpage is indicated by a certain lack of uniformity in the behavior of different specimens of the same material.

Line A in Kern's Figure 6, reproduced here, shows graphically what happened to acrylics in six months. In six weeks, this sample of material expanded about +0.22 per cent. In twelve weeks, the expansion was still close to this figure. In eighteen weeks, it was down to about +0.12 per cent, and then it began to expand, in twenty-four weeks going up again to +0.18 per cent.

In none of these Kern graphs are there final straight horizontal lines; which would indicate that the material had assumed a definite shape and one that it would continue to hold.

The cause of these so-called "strains" is not completely understood and even theories are not abundant. One thing is certain: There is no way to avoid them.

When this material is confined to a denture base, the major harm done is the horizontal crack occasionally appearing during processing or within the next several months, on the labial surfaces of the anterior teeth. It is interesting that this crack occurs on that portion of the anterior tooth grasped by the acrylics; namely, between the pins and the gingival curtain of acrylic resin that comes down over the collar of the tooth labially, and very seldom in any other area. The fact that this is the strongest part of a porcelain tooth further illustrates the force behind these strains.

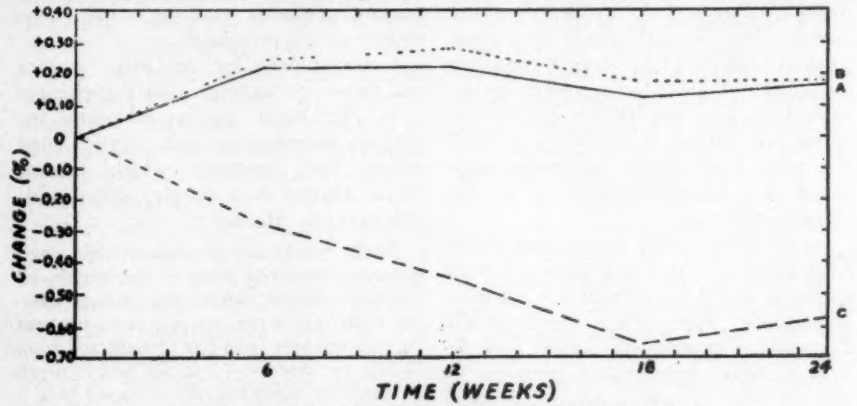
It is not difficult to replace a cracked tooth on a denture. But what happens to fine details that the dentist struggles to put into full dentures containing acrylic teeth when there is no constancy in the occlusal surfaces? What does the cement do as the acrylics keep expanding and contracting and expanding again in the case of a jacket or an inlay?

On the subject of stability, it is interesting to read the Boonton Molding Manual[7] compiled for the guidance of engineers and users of plastic materials. Such men must know the exact and definite properties of what they are using.

This is what the manual tells them about acrylics: "Its chief drawback is its tendency to continue dimensional changes for an unknown period after molding; in other words, it keeps on shrinking to a point that may be embarrassing if not allowed for."

Dentists have always prided themselves on the fact that their work was one of precision. Can it be called precision work when there is continuous dimensional change for "an unknown period after molding"?

Stability? Acrylics do not seem to have it.



Vernonite (pink); change after processing. (Kern.)

CHEMICALS

The effects of chemicals on plastics are well known. Acrylics can be destroyed completely by chloroform. Ether harms them badly. Other chemicals, such as the ketones, esters and aromatic hydrocarbons,[1] are distinctly injurious. Some chemicals soften the acrylic resin and render it vulnerable to destruction under chewing stresses.

A man undergoing an operation may

wake up to find that he needs a new acrylic jacket. A diabetic who is producing an excess of acetone may find his acrylic teeth changing owing to the action of the acetone in his oral secretions. He will literally be "eating up his teeth."

What is pertinent here is not so much the mere fact that chemicals may destroy or injure dental work. While this may mean an added expense to the patient, all restorations can be replaced.

What is of grave consideration here is the larger aspect, not of the inlay, of the jacket or of the tooth, but the welfare of the patient himself.

Monomeric (liquid) methyl methacrylate is a highly poisonous compound. Even the vapors are injurious. Constant exposure leads to a dermatitis of the tissues involved. Laws govern the conduct of those exposed to its fumes, workers being protected with special types of ventilators or gas masks.

What do we know of the effects of constantly ingesting small quantities of acrylic that can be worn off in chewing or dissolved by chemical action? What of the man who is to receive an anesthetic of ether or chloroform? What of the woman with diabetes? What of you and me?

It seems consistent with regard for the health of a patient that some study be directed to ascertaining the effects of constant ingestion of this material, even in minute quantities, before it is recommended for masticatory surfaces.

TEMPERATURE EFFECTS

Eating and drinking foods high in temperature is enjoyed by many. It is known that food as hot as 122° F. is not unusual. In fact, some people do not consider certain foods appetizing unless they are at least that hot.

In a table on the safe operating temperatures for plastics, the Boonton Manual[7] gives the low temperature for acrylate as 120° F.

The acrylics, being thermoplastic, become plastic under heat and, under proper conditions, will even revert to the original liquid state. Thus, any temperature approaching the softening point of acrylics will have a tendency to so alter the material that it will either flow readily or become soft and moldable.

When no biting stress acts upon the material, as is the case with a denture base, no apparent damage results. When a masticatory force of, say, 90 pounds—which Black believed is used in chewing a steak—is directed upon these softened acrylic teeth or jackets, it would be only logical to expect injury to the biting surfaces.

WATER ABSORPTION

From the American Dental Association Research associates at the Bureau of Standards come the figures showing that the acrylic resin denture subjected to a wetting and drying schedule may undergo dimensional changes of as much as 1 per cent or even more.

Most dentists have had the occasion to learn how embarrassing this situation may be to a patient who leaves his dentures out overnight and then finds that they fit poorly in the morning.

Experience shows that after it is wet and kept in the mouth a while, the denture resumes its old shape, perhaps under the influence of the shape of the mouth as well as the reabsorption of water and the fact that the patient becomes reaccustomed to it.

Such a condition, wherein the pressure of the tissue helps in readaptation, is not a fault that would condemn the material for denture-base purposes. A dimensional change of 1 per cent, however, on the occlusal plane when acrylic teeth have been used may result in a patient's biting too hard in one place and causing resorption of the ridge at that point. This cannot be overcome entirely by instructing patients to "sleep with their teeth." Mouth breathing at night may affect the anterior teeth to

the extent of this 1 per cent of change.

COLOR

When acrylics were first introduced into dentistry, they were received with great rejoicing because of the improved color possibilities apparently offered. Today, it appears that the present known pigments do not give satisfactory results for permanently simulating tooth structure. Some question arises as to the uniformity and permanency of the final color, and the best authority here is any man who has made acrylic dentures.

All of the many prosthodontists consulted have had the experience of watching the pink slowly become lighter, of having spots of blotching appear and of examining a plate some years after use to find varying shades of pink in the same denture. These changes were found regardless of the source of the material or the degree of care used in its polymerization.

Fortunately, since only a lightening occurs, or a mottling, which may merely further resemble the tissue membranes, the changes in color in an acrylic denture are not disastrous. When the structure to be simulated is a tooth, however, the same changes may limit the use of the material and virtually prohibit its use in the anterior part of the mouth.

Clyde A. Nelson[8] expertly sums up this problem when he says, "I believe that, with all the work that has been done on resins, future developments will not come so much in the type of pigments used for coloring, but in, first, possibly some new and, as yet, unknown types of resins."

SUMMARY

The Brinell hardness of acrylics clearly indicates that they fall far below a point where they can be considered for a masticatory surface.

So far, competent observers agree that the material never assumes a final shape which it can be depended on to hold for even a short period of time, much less a reasonable length of time such as would be required in dentistry.

It is very vulnerable to ketones, esters and aromatic hydrocarbons; which may be very embarrassing under certain conditions.

It has a softening point that is not high enough to assure hardness under liquids and foods the temperatures of which may approach the low softening point of acrylics (120° F.).

The cycle between drying and wetting causes nearly 1 per cent change in the shape of acrylic resin.

Although it may be quite color stable outside the mouth and under severe tests of powerful lights, in usage in the mouth acrylics have shown no dependable color stability.

Any of the above-mentioned points would be, in itself, sufficient to cause hesitancy in the adoption of acrylics for teeth or other masticatory surfaces. In combination, they do not make the picture any more attractive.

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DECEMBER 1 — *Editorial Department* — 1942

A COUNCIL ON DENTAL HEALTH

PROBABLY the most progressive step made at the recent meeting of the House of Delegates of the American Dental Association in St. Louis, was the coordination of the work of the two committees, the National Health Program Committee and the Committee on Public Health and Education, and that of the Bureau of Public Relations by the creation of a committee to be known as the Council on Dental Health, under the chairmanship of Emory W. Morris, Battle Creek, Mich.

Dr. Morris brings to this work an extensive experience in dental public health education which eminently qualifies him for directorship of the present project and practically assures a successful outcome of the efforts of the committee.

The President, Dr. Oliver, in his presidential report to the House of Delegates, recommended the coordination of effort that is now being directed toward research on dental caries in an effort and with the desire to make practical application of our present capabilities to control caries.

Dr. Oliver, in presenting the background for his recommendation to coordinate all efforts toward dental health, showed a depth of understanding of the seriousness of the problem, but refused to accept the

fatalistic attitude toward dental conservation that appears to some to be warranted by the lack of progress toward the solution of the etiology of dental caries. Dr. Oliver also showed full appreciation of the excellent groundwork that had been done by the National Health Program Committee. He paid fitting tribute to their efforts and expressed a feeling of regret at the decision to retire on the part of those who had initiated the National Health Program effort. We are sure that all who are familiar with the pioneering efforts of this committee share the feeling of regret expressed by the President, but we can all be grateful for a heritage left to the new Council that will insure fruitful results from future efforts.

Acting upon the recommendations of the Reference Committee, to which consideration of the various aspects of the subject of dental health was referred, a council on dental health was established as a standing committee of the Association to take the place of, and carry on the work of, the National Health Program Committee and the Committee on Public Health and Education, and to direct the activities of the Bureau of Public Relations. These committees were all in hearty accord with the new health project and a number of the members of the two committees have accepted membership on the new committee.

The duties of the new Council on Dental Health as designated by the Trustees are:

1. To study the need and develop plans and programs for the provision of more adequate dental care for the public and to study and make recommendations concerning any other plans or programs developed to promote the dental health of the public.

2. To assist constituent and component societies in the development of dental health policies and programs within their jurisdiction.

3. To establish and maintain relations with agencies interested in programs for dental health.

4. To supervise the activities of the Bureau of Public Relations and to make recommendations concerning the work of the bureau to the Board of Trustees.

5. To correlate its own activities with those of the other standing committees of the A. D. A. when situations of common concern arise.

This rather belated step by the Association, if we may be allowed a hibernianism, is quite timely and in line with the desire of the profession to prepare for the care of the dental needs of the country in the postwar period, when the demands will be more acute than they are

now and when dental facilities will be much less than they are at the present time.

The recent agitation in regard to the etiology of caries, culminating in the survey of our knowledge of the subject, and the dramatic findings of the examination of the first one million inductees into the Army have been responsible for an awakening on the part of the profession to the importance of such steps as the one under consideration that may lead to the transfer of this most prevalent disease of the human race—dental caries—from the control class to the preventive class.

If, as we hope, this important step results in the inauguration of a program that will lead to a systematized effort to care for the dental needs of the people in a more intelligent and comprehensive manner than ever before, much progress will have been made.

If the revelations of the dental examinations made early in the war emergency do no more for dentistry than to arouse the profession to a recognition of its delinquency and the delinquency of all health agencies so far as public dental health is concerned, they will have served a most helpful purpose.

THE RELIEF FUND CHRISTMAS SEALS

AGAIN the season of the year has rolled around when it becomes our pleasure to speak a good word for probably the most worthy philanthropic cause in dentistry—the sale of Relief Fund Christmas Seals.

For twenty-five years, the Relief Fund Committee has promoted the sale of these seals each year with the sole purpose of beneficent aid to those upon whom misfortune has fallen, and the instances in which this aid has relieved the distress of misfortune are many and are increasing with the years.

There is no doubt in our mind that the perennial enthusiasm of the individual members of the Relief Fund Committee has produced the sustaining effort that has brought such eminent success to this project.

In normal times, the calls for help from unfortunate dentists who are compelled by circumstances to depend upon the generosity of their brothers are not so numerous in proportion to the number in the profession, but, in troublous time, as in war, depression and calamity, the number greatly increases and the need for generosity and humanitarianism is greatly intensified. This year, the first year of our active partici-

pation in the world holocaust, will see a large increase in the number who will have need for aid from the Relief Fund, and we appeal to all who have not already responded to the call to do so at once and to the very limit of their ability.

The Relief Fund, with the wide benefits that it has bestowed, is a unique institution in the professional world and its success has become the pride and joy of all those worthy welfare workers who have promoted and directed the movement during the past two decades.

The response thus far this year has been more extensive and generous than usual, and we attribute this to the humanitarian reaction toward the present horrible war of destruction. And in what manner can those who are not able to take an active part in combat service better serve dentistry and humanity?

By the time this issue of THE JOURNAL reaches its subscribers, a letter containing one hundred of these seals will have come to every member of the Association. This most worthy cause waits upon a generous response to the yearly appeal for the participation and generous support of each member.

Every member of the American Dental Association is entitled to and most of them are eligible for participation in the fund to which the contribution is made, individual benefit being contingent only upon participation of the state society, and it is the duty of every member of the Association to see to it that his state society takes its part in this movement.

While the benefits are restricted generally to membership in the Association, there have been instances in which dentists who were not members of the Association and some who had allowed their membership to lapse have enjoyed the benefits of this purely voluntary benevolence.

If every member could see some of the grateful expressions from recipients of the benefits of the Relief Fund, they would experience to the full the wonderful thrill of joy that comes to every one who contributes to a cause that is founded solely and purely on the Golden Rule.

Now more than ever before, the Relief Fund Committee needs your helpful cooperation, and we pledge for the committee the wise administration of the fund that has been conspicuously characteristic of this benevolence from its inception. The feeling expressions of gratitude have been the sole reward of the committee, and we do not believe that there has been a single instance in which this generous spirit of the com-

mittee has been in the least imposed upon. On the other hand, there have been numerous instances in which the recipients of the benefits have returned to the fund the full amount of the benevolence that was extended to them, thus emphasizing their gratitude and appreciation in a manner most reassuring to the committee.

THE ANNUAL INDEX

THE annual index for Volume 29, 1942, of THE JOURNAL will be published in the Mid-Monthly issue for December 15.

It has long been our custom to include the annual index in the December issue, but the publication of the Mid-Monthly issues makes it necessary to publish the index in the December 15 Mid-Monthly issue, the last number (No. 20) of Volume 29.

BIBLIOGRAPHICAL

A Manual for the Differential Diagnosis of Oral Lesions

By JOSEPH L. BERNIER, D.D.S., M.S., Major, Dental Corps, U. S. Army; Curator Dental Division Army Medical Museum, Secretary and Pathologist to the Registry of Dental and Oral Pathology of the American Dental Association; Chief of the Oral Pathology Section in the Department of Preventive Medicine and Clinical Pathology, Army Dental School, Army Medical Center, Washington, D. C. Cloth. 228 pages. 175 illustrations. Price $4. St. Louis: The C. V. Mosby Company, 1942.

THE field of oral pathology is so wide and so complex that most of the recent textbooks on the subject have been voluminous. In sharp contrast is this neat little manual of 288 pages. Dr. Bernier has had much experience in diagnosing lesions of the oral cavity, for he has served as curator of the Dental Division of the Army Medical Museum and pathologist to the Registry of Dental and Oral Pathology of the American Dental Association. All of the excellent photomicrographs in the book are from the files of the Army Medical Museum.

The primary objective of the author was, as stated in the preface, "to provide a handy reference to the pathology and clinical features of the common oral diseases." He wisely starts his book with a discussion of the indications for biopsy and the technic for obtaining and caring for the tissue. Major Bernier then describes the histologic structure of the skin and mucous membrane, the principles of inflammation, superficial lesions generally local in character, superficial lesions generally specific in character, benign tumors of the oral region, malignant tumors of the oral region, oral cysts and miscellaneous diseases of the oral region.

The author has not attempted to include all diseases and tumors of the mouth. No consideration is given dental caries, diseases of the teeth, periodontitis, etc. Instead, he has placed emphasis upon those lesions of the oral soft tissue and alveolar bone that seem to be most common. Brief discussions

of the etiology, differential diagnosis, clinical features and treatment accompany detailed descriptions of the microscopic appearance of the lesions considered. The book would be more valuable to dentists if the clinical aspects of each oral lesion were illustrated. It is well written and the material presented is scientifically acceptable, although one wonders why osteomyelitis is included under benign tumors and why the rare Gaucher's disease is given more space than many more common lesions.

The book should have a wide reading by dental students and by practitioners who must diagnose and treat many oral lesions.

M. K. H.

Science and Sanity. An Introduction to Non-Aristotelian Systems and General Semantics.

By ALFRED KORZYBSKI. Lancaster, Pa.: Science Press Printing Co.

THIS volume comprising three books by Count Alfred Korzybski represents a thorough and intensely interesting study of a subject called "General Semantics." This subject differs from the usual understanding of "semantics" (the study of word meanings) by concentration on the meaning of word, fact and event relationships. The theory of relativity of Albert Einstein plays an important part in the development of the subject matter. Study of this scientific work by Korzybski leads one to become more interested in other scientific efforts.

Dentists are peculiarly well situated to appreciate the volume by the very nature of their vocation. Proper evaluation and understanding of the thought processes of the dental patient are extremely valuable in diagnosis and treatment. This volume stresses the value of correct language in conveying definite meaning as from patient to dentist in describing symptoms or dentist to patient in mental preparation for treatment.

There are many ways in which "general semantics" can influence a dentist's behavior beneficially. It would take a book to cover them all. The scope is so wide that it reaches out into every branch of science and indeed embraces the whole realm of thinking processes.

When we talk or write, we try to convey meaning to some one else, and unless the evaluation of subject matter is correct, we tend to influence others erroneously. When we make an examination of a patient's mouth, we have to leave out or abstract many features in our records. Some of these "left out" features might be relevant to future treatment. We must evaluate what we find as related to the "body as a whole," including the patient's combined physical, physiologic and neurologic makeup, as well as his environment.

The element of time as related to structure and space is stressed throughout the whole work. Any dentist will readily appreciate what a difference even a few moments can make in the sequence of events in diagnosis, and the consequent treatment, etc.

"General Semantics" is an aid in solving dental problems because it fosters the "I do not know—let's see what we find!" approach. With it, we face the facts, rather than "jump" at preconceived conclusions for all seemingly similar cases. "General Semantics" looks to differences as well as the similarities for orderly evaluation. Emphasis on several interesting devices for delaying reaction is made. These devices are indexes, dates, etc., hyphens and quotation marks. It is impossible to do justice to such a "monumental" work or the author in this brief review.

The reader is warned that serious study is necessary to the understanding and utilization of the suggested material. Some further helpful features of the volume should be included even though space does not permit full explanation.

The "structural differential," a graphic device exhibiting structural differences between words and things, etc., invented by the author, is used in evaluating by separating the experience or event process from the object and its labels.

Korzybski has based his work on the dynamic, ever-changing world about us. He takes issue with the 450 B.C. stationary labels or identifications of Aristotle, preserving the principles, but revising the methods. He calls his theory non-Aristotelian. He warns us to be careful to discern between the following distinct levels of "knowing": the verbal level, the macroscopic level and the submicroscopic level.

It may be consoling or irritating to dentists to learn that their dental practice is at least

dependent on "the product of the working of their own nervous system." It would be of inestimable value if we could all start with clear minds and take on the non-Aristotelian methods of thinking. Unfortunately, however, we all have many habitual "conflicts" and semantic "blocks" due to our generalizations which we have become accustomed to and accepted as correct through years of erroneous assumptions. To quote: "It appears that under the present linguistic, educational, social, economic conditions, nearly all of us suffer from nervous responses." (Strictly human reactions would be conditional; animal reactions are conditioned.)

In the final paragraph of the chapter on "Conditional Reactions and Psychiatry," page 365, we find a most interesting and valuable conclusion:

> At present only in technical mathematics can people behave semantically like "gentlemen." They analyze and agree; no quarrels are possible. Linguistic and semantic researches show that the structure of all languages can and MUST be made similar to empirical structures; and probably will behave in a less silly and futile way than they have done in the past and are doing in the present.

Dentists will be particularly interested in Books I and II, especially "Non-Elementalistic Structures," in which a chapter on "The Organism as a Whole" might well be amplified; Part IV, "Structural Factors in Non-Aristotelian Languages"; Part VI, "On Psychophysiology"; Part VII, "The Mechanism of Time-Binding." Those who have a mathematical background will probably understand Book III.

It is not exactly a "criticism," but rather a "lament" to the majority that the subject of "general semantics" requires so much time and concentrated thought before its benefits become apparent. The study of this work and several other related books is heartily recommended, in order to understand what our children will be talking about five years hence.

FREDERICK A. TREVOR.

Outline of the Chemistry of Dental Materials

By LAURENCE G. WESSON, Ph.D. St. Louis: C. V. Mosby Co., 1942. 106 pages. Price $1.50. Cloth.

A DISCUSSION of the basic physical and chemical concepts that underlie all chemistry occupies the first third of this small book, and the remainder consists of an itemized description of many of the chemical compounds, with their reactions, and some of the ceramic and metallurgic materials used in dentistry. The book is encyclopedic and, as an inevitable result, somewhat superficial.

If one accepts the theory that chemistry, if it is to be taught at all, should be portrayed in accordance with the most modern concepts of the subject, the book is disappointing, especially in the inorganic section, where only scant reference is given to the electronic theories of valence and the reactions between electrolytes in solution are written without reference to their ionic character. For example:

$$H_3PO_4 + NaOH = NaH_2PO_4 + H_2O$$

and

$$AgOH + 2NH_3 = Ag(NH_3)_2OH$$

However, there is much sound information of practical value especially to the reader who wishes to gain some knowledge of the chemistry of dental materials with the expenditure of a minimum of time and effort. The language of the text is simple and it is easy and interesting to read.

D. A. W.

Manual of Standard Practice of Plastic and Maxillofacial Surgery

Prepared and edited by the Subcommittee on Plastic and Maxillofacial Surgery of the Committee on Surgery of the Division of Medical Sciences of the National Research Council and representatives of the Medical Department, U.S. Army; Robert H. Ivy, Chairman. Cloth. 432 pages. 259 illustrations. Price $5.00. 1942. Philadelphia: W. B. Saunders Co.

CORRECTION: In the review of this book, published in the September 1 issue, the price was incorrectly quoted as $4.50.

Physical Chemistry for Students of Biochemistry and Medicine

By EDWARD STAUNTON WEST, Ph.D., Professor of Biochemistry in the University of Oregon Medical School. 368 pages. New York: The Macmillan Company, 1942. Price $5.75.

THIS book contains the essentials of physical chemistry which are helpful to medi-

cal and dental students in their usual course in biochemistry. Most of the highly theoretical material which is usually contained in physical chemistry texts, and which is not directly applicable to biochemistry, is omitted.

The book is written very clearly, with adequate applications to biochemistry, which would be of much interest to dentists and physicians. It is printed well, and there are very few errors. The mathematics of the subject, which is usually avoided by students of medicine and dentistry, is made sufficiently simple for most of the students to grasp.

The chapter on colloids and membrane phenomena is particularly good, containing material which is of major interest to students of medicine and dentistry, and which is usually omitted from most texts on elementary physical chemistry. The chapter on atomic and molecular structure is well presented and sufficiently comprehensive. At the end of each chapter are a number of exercises and problems. Many of these exercises stress principles of biologic interest and should be of great teaching value.

A course containing the material in this book would be of much greater importance to premedical and predental students than a course in elementary physical chemistry, which is usually given to this type of student. The text is not adequate, however, for students majoring in biochemistry, unless the usual course in physical chemistry is a prerequisite. The book could not readily be used as a text for dental students, as no time is available in the usual dental curriculum. However, it would be excellent as a work of reference, and it is an excellent text for a course for predental or premedical students.

L. S. F.

Ritual for Myself

By ANDERSON M. SCRUGGS, D.D.S., New York: Macmillan Co., 1942. Price $1.50.

"RITUAL for Myself" is not a textbook of dentistry, nor is it by any stretch of the imagination dental literature, but it is the product of the poetic talent of a dentist who has attained considerable prominence in a field rather far removed from the practice of dentistry.

Dr. Scruggs' philosophy of life is beautifully portrayed in what to us appears to be poetry of unusual merit and charm, and the book furnishes another example of what may be termed extracurricular versatility of the dentist.

Dr. Scruggs' claim to a place in the poetic sun is substantially supported by "Glory of Earth" and "Ritual for Myself" and by the fact that many of his poems have appeared in the popular high-grade magazines of the day. His "Glory of Earth" has been widely noticed and quoted by many authorities in the field of poetry.

Dental Helps

National Association of Retail Druggists. Price 15 cents. 24 pages.

"DENTAL Helps" is designed to help the dentist with the writing of individualized prescriptions for his patients. It offers many suggestions that will clear up the "mysteries" of prescription writing; suggests official preparations useful in the dental office, and in other ways points out how the dentist may make use of the professional services that his pharmacist can provide.

Interpretations of pharmaceutic words and phrases, sample prescriptions, conversion tables and lists of dangerous and habit-forming drugs are included.

This booklet should be useful to the dentist who wishes to write prescriptions.

Nutrition and Chemical Growth in Childhood. Volume I: Evaluation

By ICIE G. MACY, Ph.D., Director of the Children's Fund of Michigan; Consultant for Nutrition to the Pediatric Staff of the Children's Hospital of Michigan; Member of the Food and Nutrition Board of the National Research Council; Honorary Member of the Society for Pediatric Research, Member of the American Society of Biological Chemists; Former Secretary of the American Institute of Nutrition. Springfield, Ill.: Charles C. Thomas, 1942. Cloth. 432 pages; 66 illustrations and 122 tables. Price $5.

THIS is the first of two volumes to be published by Dr. Macy on "Nutrition and Chemical Growth in Childhood." These two books are to include the results of many years of intensive clinical and biochemical study of normal children in the Research Laboratory of the Children's Fund of Michigan. Mem-

bers of the group working in this laboratory have devoted most of their time for the past ten years to the study of children between the ages of 4 and 12.

Volume one deals with the problems of evaluating nutrition and growth in childhood. Emphasis is placed upon details of technics for evaluating the nutrition and growth of children. Volume two will emphasize interpretations of findings.

The author outlines detailed procedures for chemical analysis of food, urine and feces for energy, carbon, fats, lignin, cellulose, calcium, magnesium, potassium, sodium, chlorine, sulfur, iron, manganese, nitrogen, etc. More than 150 tables and sixty-six illustrations are included to clarify the tests. References to current literature occupy twenty-four pages.

The author states (page 59) "A study of nutrition and growth is not complete without some knowledge of the development of the dental arches and the occlusion of teeth; of any undesirable habits or physical abnormalities which may influence normal growth and development of the teeth and dental arches; the occurrences and number of teeth present, the condition of the periodontal membrane and the environmental conditions in the mouth, such as dental caries activity and oral hygiene." She then mentions the oral conditions to be studied. Only a few pages are devoted to the dental examination itself.

The format of the book is good. The type is large and easy to read and the illustrations are clearly reproduced. All references are grouped in the back of the book, preceding a good author and subject index. For those interested in studying growth and nutrition in childhood, this book should prove invaluable.

The Biology of the Negro

JULIAN HERMAN LEWIS, Ph.D., M.D., Associate Professor of Pathology. The University of Chicago Press, 1942. 407 pages.

"DISEASE tends to prove the kinship of the different races of man but at the same time clearly demonstrates some of their differences." Beginning thus, the author proceeds to describe in a straightforward, concise manner all the clearly established biologic differences between the native and the American Negro and the Caucasian.

Of particular interest are two chapters, "Surgical Disease" and "Dental Disease." The Negro accepts surgery stoically, takes anesthesia well, resists infection and has a remarkable ability to heal. With the number of teeth with five cusps and the number of "shovel-shaped" incisors as criteria, the Negro's teeth are found to be more primitive than the Caucasian's. The author believes that the alleged excellent quality of the Negro's dentition has been substantiated by investigation in both Africa and America, but possibly the difference between native and "civilized" diets has not been given sufficient consideration in this book. As compared with the Caucasian, the native Negro has a precocious tooth eruption. No statement was made as to the size of the teeth of the Negro. Lewis cites evidence that native and American Negro children have a consistently lower incidence of caries. Gingivitis is "in excess" among Negro children. These differences in the incidence of disease disappear as adult life is reached, probably because the environmental factors in modern diets have overcome any inherited racial advantages.

W. F. BARNFIELD.

Traumatic Surgery of the Jaws

By KURT H. THOMA, D.M.D. Professor of Oral Surgery and Brackett Professor of Oral Pathology, Harvard University. St. Louis: C. V. Mosby Co., 1942. Cloth. 315 pages with 282 illustrations. Price $6.

As the author states in the preface to this new book, the volume is presented to assist the dentist in his preparation for first aid and emergency treatment of jaw injuries. In addition, it is hoped that the book will be of use to students in preparing for military service and as a reference work for the treatment of the more difficult unusual types of jaw injuries. The book has adequately fulfilled these requirements as a practical account of the treatment of jaw injuries. The volume opens with a chapter on first aid treatment, followed by an account of anesthetic methods and treatment planning. Facial wounds, injuries to the teeth, fractures of the mandible and maxilla and injuries to the mandibular condyles and joints are taken up in a consecutive and moderately detailed account. Perhaps the main feature of this

book is an account of the new methods of treating fractured jaws by modifications of the skeletal traction and fixation apparatus used so successfully by Roger Anderson and others in the treatment of fractures of the long bones. Essentially, these methods evolve from the placement of sufficient pins in the mandibular bone on each side of the fracture line to provide positive control of each fragment, the fractures then being manipulated into position and locked with a connecting bar. This method has its greatest application in the treatment of complicated fractures, particularly those containing fragments without teeth. The great advantages are positive control of edentulous fragments and the elimination of the necessity for fastening the jaws together. The several types of apparatus that have been presented as assuring these results are adequately described. No mention is made of the single or multiple Kirschner wire method of maintaining reduction of certain fractures.

Several minor criticisms may be given this new volume. The short chapter on first aid contains the usual material that would in general be suitable for the instruction of non-professional groups. In the short sections dealing with specific injuries, such as burns, insufficient information is presented to enable a dentist having no experience with such injuries to treat or evaluate them. For example, no mention is made of the use of plasma in the treatment of burn shock and hemoconcentration. Open operations on the mandibular condyles are well covered. The illustrations for this section have apparently been taken from cadaver material. It seems that the incision recommended for arthroplasty of the mandibular condyle could be improved to provide a more inconspicuous scar and also to eliminate some of the danger to the facial nerve. This feature is discussed in the book and the author apparently has had success with the incision described, although it seems quite low on the face and is carried rather far anteriorly for this level. On the whole, the volume can be recommended to those who wish to improve their understanding of the treatment of jaw injuries as well as to those desiring an account of the new methods used in their treatment.

F. F. K.

The Pharmacopoeia of the United States of America

(The United States Pharmacopoeia). Twelfth Revision (U. S. P. XII). By authority of the United States Pharmacopoeial Convention. Prepared by the Committee of Revision and Published by the Board of Trustees. Official from November 1, 1942. Printed and Distributed by Mack Printing Co., Easton, Pa. Price $7.50.

THE acme of medical practice is a distinctive personal prescription, designed by the skilled physician and compounded by the trained pharmacist to meet the peculiar needs of each patient, the basic drugs of such prescription being standardized by the U. S. Pharmacopeia.

The many changes in and additions to this new XII edition have added materially to the worth of a book whose value is incalculable.

Among the most important additions is a list of U. S. P. substances and their preparations and products in English and Spanish, a new feature following the title page, in which basic substances are listed alphabetically under their English titles and under each are given the products or preparations of that drug which are found in the U. S. P. XII.

As the result of the frequently registered complaint that the ten-year periods between revisions do not make for an up-to-date pharmacopoeia, it is proposed to publish a supplementary edition every two and one-half years, these supplements to be supplied to the purchaser of the U. S. Pharmacopoeia XII at no additional cost.

As an example of the scope of the U. S. Pharmacopoeia, the new twelfth edition contains a total of 659 medicinal products, 160 of them being new drugs and medicinal preparations. The information on drugs and medicinal products contained in the Pharmacopoeia is encyclopedic in nature and scope and should be in the hands of all who compound or prescribe drugs.

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WAR SERVICE COMMITTEE

NATIONAL DENTAL SALVAGE PROGRAM

ORGANIZATION

THE dental salvage program is headed by the American Dental Association Salvage Committee, consisting of a chairman and four members. Dental salvage committees, consisting of a chairman and several members, will be appointed within each state. The chairmen of the state committees should select representatives from the dental dealers and dental laboratories within their respective areas, to cooperate with the committees. In states where the National Dental Association (Negro) has members, the committee should request their cooperation.

All dental offices should be included in the program whether or not the dentist is a member of the American Dental Association.

Members of state committees should contact the general salvage committees in their communities and advise them of this program and request their support.

PURPOSE

The war effort needs all scrapped and obsolete rubber and metal products to compensate for a shortage of new material in the production of the many items necessary for the "drive against the Axis."

No materials should be considered if they can possibly be used, can be made serviceable or will have to be replaced by new materials or equipment. Conservation of present material or equipment should be a prime objective of every dentist.

The salvage materials from dental offices should include the following items:

Rubber: Dam, tubing, hose, mats, bulbs from water and air syringes, washers, rubber tips from ends of anesthetic tubes, unvulcanized scrap.

Metal: Lead backings from x-ray films. Old copper and aluminum bands and scrap clippings therefrom. Electrodeposited copper dies and models. Scrap tinfoil or leadfoil. Old electric wire. Metal tubing (copper, tin, iron and brass). Broken or discarded steel operating instruments. Discarded burs, mandrels and mounted points. Discarded or obsolete laboratory instruments and equipment. Discarded or obsolete appliances and equipment, chairs, cuspidors, bracket tables, furnaces, motors, units, x-ray machines, stools, metal desks, chairs, tables and cabinets, lights, fans, safes and all appliances of discarded technic. Discarded handpieces, straight, right and contra-angles. Tin can containers (large). Aluminum (mirror handles, old dentures, impression trays, and caps from novol anesthetic tubes). Any other items containing rubber or metals.

Collection should be continuous for the duration.

PLAN

Under the dental salvage plan, in cooperation with the General Salvage Section, Conservation Division, War Production Board, the following procedure will be instituted:

1. All dentists or contributors, whether or not they are members of the American Dental Association, are urged to donate the needed material. Dental schools should be solicited, as well as laboratories.

2. Salvage depots or places where scrap material can be deposited should be designated by local committees.

3. The following small items should be placed in suitable separate containers

(box, envelopes, etc.):

A. Rubber items

B. Tin and lead items

C. Copper and aluminum items

D. Burs, mandrels, mounted points.

4. All large equipment and appliances that cannot be easily moved should be listed and the list turned over to the committee so that arrangements can be made for the removal to a salvage depot.

5. Receptacles where material can be deposited should be placed in professional buildings and meeting places.

6. Dental dealers and laboratories should be urged to assist in the collection of the scrap material.

7. Disposition: Information relative to methods of disposition of scrap material, names and locations of scrap dealers and any other details of the disposition of salvage can be secured from the general salvage committee in your immediate locality.

Rubber, steel, iron, copper, brass, aluminum, lead items are to be sold to junk or scrap dealers; tin to be returned and sold to suppliers.

8. Proceeds from the sale of material is to be used to purchase War Savings Stamps and Bonds:

(a) Stamps and bonds to be turned over to the American Dental Foundation, Inc., to be held until date of maturity and then used for some purpose to be decided by the Foundation; or

(b) Stamps and bonds to be turned over to a component or state society, to be held until date of maturity and then used for some specific purpose.

9. All official communications and notices to members by officers of state and component societies are to include requests for dental salvage.

10. Local newspapers are to be requested to publicize the program.

REPORTS

Chairmen of state committees are to report to Henry A. Swanson, chairman, Committee on Dental Salvage, American Dental Association, Suite 500, 1726 Eye Street, N.W., Washington, D. C., the results of the salvage program:

1. Approximate amount of scrap collected.

2. Amount realized from sale of material.

3. Number of bonds or stamps purchased.

4. What assignment was made of bonds or stamps purchased.

Our aim is to "Get Out the Scrap" regardless of any financial returns that may result and may our efforts help to

BEAT THE AXIS!

National Dental Salvage Committee
HAROLD J. CRONIN,
J. V. GENTILLY,
H. E. KING,
H. B. HIGGINS,
HENRY A. SWANSON, *Chairman.*
1726 Eye St., N.W.
Washington, D. C.

COUNCIL ON DENTAL THERAPEUTICS

IPANA TOOTH PASTE—NOT ACCEPTABLE FOR A.D.R.

[Report of the Council on Dental Therapeutics of the American Dental Association, authorized for publication. —DONALD A. WALLACE, *Secretary.*]

THE Council's report holding Ipana not acceptable for A.D.R. was submitted to the Bristol-Myers Company. The firm's reply to the Council's letter was referred to the Council referee, who found that the firm's letter does not contain evidence upon which the Council's report should be withheld from publication or fundamentally revised. The Council therefore voted to publish the following report.

With an increasing emphasis on the need for proper dental care comes the added responsibility of providing means for such care, and of furnishing information on what constitutes effective preventive and remedial measures for combating dental disease. The importance of this added responsibility cannot be overemphasized. Although this point has been touched upon in numerous Council reports, it is worth while to reiterate what practitioners of both dentistry and medicine recognize as a fact; namely, that it is of little or no avail to provide the means of safeguarding public health unless those for whom such means are provided recognize their value and utilize them properly. Obviously, utilization of the effective measures is incompatible with concepts of dentistry based upon misinformation, misleading statements or half-truths.

The Council has received numerous requests for information on Ipana Tooth Paste. The nature of such communications has varied from questions like this: "I have used Ipana Tooth Paste for three months and my gums still bleed. Why?" to the critical letters from lay persons who are disposed to doubt the therapeutic claims made for this preparation. On the other hand, there are probably numerous persons who, having implicit faith in what is said on the printed page or over the radio, accept without question the claims made for Ipana Tooth Paste and other agents of this class. In view of the large expenditures of the Bristol-Myers Company on advertising of Ipana Tooth Paste (reported expenditures for magazine advertising alone in 1941 was $1,214,571), it can be accepted that the firm's propaganda has considerable influence on public concepts of dentistry. In view of the foregoing, the necessity for again scrutinizing advertising claims for Ipana Tooth Paste is apparent. If the claims made are factual and reasonable, the firm should be commended for its service to the public. On the other hand, if the claims made for the product are misleading, the public interest requires that this be made known.

Ziratol and Ipana Tooth Paste were the subjects of a previous report (J.A.D.A., 21:2223, December 1934), in which it was pointed out that therapeutic claims made on behalf of Ipana Tooth Paste, including pink toothbrush "scare" advertising, were unwarranted because of a lack of adequate evidence and were misleading. Prior to this time, ziratol, which was purported to be the active medicinal agent in Ipana Tooth Paste, was the subject of a report by the American Medical Association (*J.A.M.A.*, 68:1191, October 6, 1917). Ziratol has not been mentioned in advertising of Ipana Tooth Paste for a number of years. Recent tests in the A.D.A. Bureau of Chemistry indicate that it is no longer present.

Prominent among claims currently made for Ipana Tooth Paste are in effect these: Ipana with massage is of value in treatment of "gum disorders." The firm claims that "gum disorders," including pink toothbrush, are due in large measure to the soft foods that the public consumes.

In advertising that has appeared in dental journals (to the misfortune of the profession), it has been claimed that Ipana Tooth Paste is of value for building strong, sound teeth and resistant, healthy gums. This advertising can best be characterized as preposterous. There is no scientific basis for it as far as the Council is aware, and the fact that it is presented in the characteristic indirect manner of Ipana advertising makes it no more credible or logical.

It will be noted that the Bristol-Myers Company, in preparation of advertising material, has employed the expedient of weaving therapeutic claims into the fabric of statements, some of which in themselves might go unchallenged. Thus, the firm exhorts the patient to see his dentist at the first sign of pink toothbrush, then goes on to state that the dentist will quite likely advise massage with Ipana. The question might naturally arise, "If the treatment is as simple as that, why go to the dentist at all?" Despite the fact that it has not been shown that Ipana is necessary or desirable for "gum massage," the firm has, over a period of years, used various slogans embodying this theme. That these have not all gone unchallenged can be seen in the fact that the firm has signed a stipulation with the Federal Trade Commission to cease and desist from stating: "BUT THE CIVILIZED WAY TO BUILD FIRM GUMS IS IPANA AND MASSAGE. . . . IPANA and MASSAGE will prevent one from becoming a 'DENTAL CRIPPLE'. . . . Rubbing of a little IPANA TOOTH PASTE into the gums will produce a new circulation awakening the 'tissues' and resulting in a new, healthy firmness in the gum walls themselves." (Stipulation No. 01714.)

In view of the fact that the firm is apparently of the opinion that most gingival disorders can be attributed to eating soft foods, it may be of interest to consider briefly the present status of the influence of local action of food on gingival health. In a report prepared for the Council by Dorothea Radusch (J.A.D.A., 28:1524, August 1941), it was pointed out *inter alia* that some primitive peoples subsisting on a diet unchanged by contact with civilization are almost invariably afflicted with gingival disturbances. This authentic finding should be considered in relation to bold claims for Ipana Tooth Paste. On the other hand, it has been shown in animal studies that a soft diet tends to increase the incidence and extent of gingival changes. Whether these findings can be transferred directly to conditions affecting human beings is another matter. The report of Pelzer (J.A.D.A., 27:13, January 1940) is an attempt to do this, but the data presented are not convincing. The Council is in agreement with the findings and conclusions of Dr. Radusch to the effect that, to date, the degree of function that will permit normal tissue maintenance has not been determined.

Clinical experience would indicate that the physiologic response of the tissue is a more pertinent factor than actual pounds pressure. From the research reviewed, especially that on mineral metabolism, it would seem reasonable to assume that the tissue response is due at least in part to the nutritive status. As previously stated, shifting of teeth in experimental animals occurred to a greater extent in those kept on inadequate mineral diets. Likewise, it seems logical that some degree of function is desirable for development and maintenance of supporting tissues. Until further data are presented, moderation is probably advisable.

On the basis of our present knowledge, the public should be instructed that there are many possible causes of soreness and

bleeding of the gums, including local and systemic conditions; that a properly constructed toothbrush, when correctly applied, is of value as an adjunctive agent in the prevention and treatment of some, but by no means all of these conditions. Finally, the public should be told that it has not been shown that the cosmetic agent Ipana Tooth Paste is either necessary or desirable for massaging gums. This will continue to be the status of Ipana Tooth Paste until it can be shown by scientific tests that the action of this product, when applied with the brush or with the finger tips, is superior to the action of the brush or finger tips alone.

The firm asserts that dentists prefer Ipana Tooth Paste to all other dentifrices for personal use. While the Council has not made an attempt to gather information of the type avowedly obtained by the Bristol-Myers Company, it has had occasion to examine the results of a similar questionnaire prepared by another firm. The replies to the latter questionnaire indicate that the overwhelming majority of dentists consider therapeutic claims for dentifrices false. Thus, it might appear reasonable for the firm to assert that many dentists use Ipana, and this is probably true, because they use free samples, but the overwhelming majority of dental practitioners consider therapeutic claims for dentifrices misleading.

REPORT OF THE A.D.A. BUREAU OF CHEMISTRY

Qualitative examination of Ipana Tooth Paste in tubes purchased on the open market indicated the presence of glycerol, gums, soap, carbonate, calcium and flavoring oils. Sulfate and phosphate were not found. Iron in traces was found. (End of chemist's report.)

From the chemist's report, it can be deduced that Ipana Tooth Paste is essentially a mixture of soap, chalk, glycerol and binding and flavoring agents. Claims advanced for the product are unwarranted and misleading, and Ipana Tooth Paste is therefore declared unacceptable for A.D.R.

FEDERAL TRADE COMMISSION ORDER ON DR. LYON'S TOOTH POWDER

The R. L. Watkins Company, 170 Varick St., New York, with its principal factory at Newark, N. J., manufacturer and distributor of various cosmetics and proprietary products, including a dentifrice known at "Dr. Lyon's Tooth Powder," has been ordered by the Federal Trade Commission to cease and desist from misrepresentation of its dentifrice product.

The Commission finds that in advertisements in newspapers and periodicals, and on radio network programs and on advertising posters, billboards and cards, the respondent states, among other things:

DO AS YOUR DENTIST DOES—USE POWDER, DO AS YOUR DENTIST DOES WHEN HE CLEANS YOUR TEETH—USE POWDER; It is the way your dentist almost invariably cleans your teeth when you go to him to have them made gleaming and beautiful. That is WITH POWDER. Thousands of people—everywhere—are adopting POWDER—their dentists' way of cleaning teeth; No matter what you have heard about "this" or "that" dentifrice, the fact remains that your dentist knows more about cleaning and beautifying teeth than any one else. *And he almost invariably uses powder.* He'll probably tell you, if you ask him, that nothing cleans and polishes teeth more effectively than *powder.*

The Commission finds that although the practice is by no means universal.

probably the majority of dentists do use powder in cleaning their patients' teeth. The powder used, however, is almost invariably pumice or silex, both of which are highly abrasive and could not safely be used by the public as a dentifrice. The active ingredient of the respondent's powder is calcium carbonate, commonly known as chalk, which is much less abrasive and less effective for cleaning the teeth. Only in isolated and exceptional instances do dentists use calcium carbonate, and, even in those cases, it is used somewhat as a supplement to pumice or silex, being used for the finishing or polishing of the teeth after the heavier work of cleaning has been completed. The respondent's product, therefore, the findings continue, is not comparable to the powder used by dentists, as to either composition or effectiveness.

The Commission also finds that the respondent has represented that its tooth powder is an effective antacid and will correct "acid mouth," this representation being made through use in its advertisements of the statement "Even as a neutralizer in acid mouth conditions, Dr. Lyon's is an effective antacid." The Commission finds that the product is, in fact, wholly without therapeutic properties and that it is not an effective antacid and is incapable of correcting any acid condition that might be present in the mouth.

Representations by the respondent in its advertisements that the product is "Free from all . . . grit . . . it (the powder) cannot possibly injure or scratch the tooth enamel . . . were found by the Commission to be exaggerated and misleading, as the powder occasionally contains particles of grit which have not been removed from the calcium carbonate in processing.

The respondent is ordered to cease and desist from disseminating advertisements containing the statement "Do As Your Dentist Does—Use Powder," or any other statement of similar import; or advertisements that otherwise represent, directly or by implication, that the respondent's product is similar to or comparable with the powder used by dentists. The respondent also is ordered to discontinue representing that the product is an effective antacid or that it will correct "acid mouth," or that it is free from all grit or that it cannot injure or scratch the tooth enamel.

Order 3596

October 3, 1942.

PRELIMINARY REPORT ON NOVOCAIN-PONTOCAINE-COBEFRIN SOLUTION, R. B. WAITE

Cook-Waite Laboratories, Inc., New York, N. Y., has presented Novocain-Pontocaine-Cobefrin solution for the consideration of the Council. The solution is said to consist of 2 per cent novocain with 0.15 per cent pontocaine and cobefrin 1:10,000 in a sterile, saline isotonic vehicle. The solution varies from the procaine hydrochloride (novocain) solutions now accepted by the Council through the inclusion of 0.15 per cent of pontocaine.

Pontocaine, brand of tetracaine (para-butylaminobenzoyl - dimethylaminoethanol hydrochloride) is a local anesthetic of the procaine type. Various tests have indicated that pontocaine is approximately six times more toxic than procaine intravenously and thirteen times more toxic subcutaneously. On the other hand, pontocaine is approximately ten times more effective than procaine and can thus be used in less concentrated solutions that are but slightly more toxic than procaine solutions producing equivalent anesthesia. Novocain-Pontocaine-Cobe-

frin solution, R. B. Waite, is said to have approximately the toxicity of a 3 per cent procaine hydrochloride-cobefrin 1:10,000 solution.

Pontocaine appears to be somewhat more irritating locally than procaine, and limited impartial investigation of Novocain-Pontocaine-Cobefrin solution, R. B. Waite, indicates a greater tendency to irritation and soreness than is evident when 2 per cent procaine hydrochloride solutions are used. Pontocaine has been used extensively as a spinal anesthetic in medicine, alone or in combination with procaine, and, for this purpose, it produces longer anesthesia than procaine alone.

Novocain-Pontocaine-Cobefrin solution, R. B. Waite, is advocated for those procedures in operative dentistry, such as extensive cavity preparations and porcelain jacket preparations, in which an anesthesia of somewhat greater profundity and duration might be desired. This being the case, it is felt that before extending Council acceptance to this product, it must be carefully shown that it is superior in this respect to 2 per cent procaine hydrochloride solutions and 3 per cent procaine hydrochloride solutions as well, since its toxicity is approximately equivalent to the latter.

Cook-Waite Laboratories, Inc., has submitted a few data in support of the claim that Novocain-Pontocaine-Cobefrin solution, R. B. Waite, does produce anesthesia of greater profundity and longer duration, and some limited observations by impartial investigators have also indicated this to be true. However, these data consist chiefly of the clinical observations of practicing dentists without any attempt to compare the results with control cases in which standard anesthetic solutions were used. Further clinical evidence obtained under control conditions and by the "blind test" method would seem necessary to establish this solution as affording anesthesia of definitely greater duration and greater profundity than the presently employed solutions or a 3 per cent solution of procaine hydrochloride with a suitable vasoconstrictor content.

Since Cook-Waite Laboratories, Inc., has indicated its intention of proceeding with more clinical research on this problem, the Council is awaiting controlled evidence before continuing with its consideration of Novocain-Pontocaine-Cobefrin solution, R. B. Waite.

BUREAU OF PUBLIC RELATIONS

THE ORAL HEALTH GROUP OF THE A.P.H.A.

THE Oral Health Group, the membership of which consists of Public Health Dentists affiliated with the American Public Health Association, held a very successful meeting, Wednesday, October 28, in connection with the seventy-first annual meeting of the American Public Health Association. The chairman, Allen O. Gruebbell, Missouri Department of Health, presided and 115 people attended.

A paper on "Dental Services for Mothers and Children," was presented by H. E. Van Riper, M.D., Children's Bureau, Washington, D. C.

The United States Maternal Child Health budget for 1942, said Dr. Van Riper, is $10,921,602.00, of which $639,062.00, or 5.9 per cent, is budgeted for full and part-time dental personnel (salaries, fees and travel) and $25,475.00 for postgraduate education for dentists.

In "Federal Aid in Public Health Dentistry," Walter J. Pelton, U. S. Public Health Service, Washington, D. C., said that state dental divisions continue to seek larger budgets, but, in spite of this, unexpended federal funds are being returned by the states to total a goodly sum.

In "A Summary of Our Present Knowledge of the Etiology of Dental Caries," Hamilton B. G. Robinson, Washington University, St. Louis, Mo., stated that efforts directed at the control of dental caries by prescribing so-called protective food elements have met with failure. Dental embryology and physiology readily explain the reason for the failure. A dietary error is one of commission (excessive carbohydrate intake) rather than one of omission (a deficiency of minerals and vitamins).

In "An Index of the Prevalence of Dental Caries in School Children," John W. Knutson, of the U. S. Public Health Service, who has had considerable experience in the field of dental statistics, presented some information necessary for evaluation of a dental program for school children.

The discussion of the first two papers by Nathan Sinai, Dr. P. H., University of Michigan, Ann Arbor, pointed out a number of the weaknesses of dental programs today, with suggestions for their improvement.

The joint luncheon session of the Oral Health Group and American School Health Association, presided over by A. R. Turner, M.D., and A. O. Gruebbell, heard George M. Wheatley, M.D., Metropolitan Life Insurance Co., New York, on the subject, "A Physician Looks at the School Dental Program." This paper was discussed by Leon R. Kramer, Kansas State Department of Health, Topeka, Kan.

About thirty dental administrators remained for an afternoon business meeting and discussion.

The committee appointed to explore the desirability of petitioning the Governing Council of the American Public Health Association for a dental section reported that there was still some division of opinion on the subject and presented the matter to the entire group for discussion. A large majority of those present believed that the proper time had arrived to petition for a section that would give dentistry equal recognition with other sections as an important branch of public health service. A motion was passed almost unanimously that a committee be appointed to present a petition to the Governing Council of the association for a dental section. The committee

was composed of the officers, with William R. Davis as chairman. Davis, who has been an enthusiastic worker in this organization for many years, is a member of the Governing Council by virtue of the fact that he is president of the Michigan Public Health Association. He gladly presented the facts to this body, and, with the kind and able assistance of Reginald M. Atwater, executive secretary of the American Public Health Association, and several other friends of dentistry, the following resolution was unanimously adopted:

The Oral Health Group, an informal group of dental health workers within the membership of the American Public Health Association, has over the last five years tried out the plan of getting this subject before the public health profession without the creation of a formal section. It is now the considered judgment of representatives of the Oral Health Group that this informal scheme, which permits these persons to maintain their membership or fellowship in the ten sections, is not satisfactory for the long range purposes of those concerned with dental health.

They therefore petition the Governing Council herewith to take steps for considering the establishment of a section on public health dentistry with the thought that the executive board might implement this action and that provisional plans for the new section might be brought before the Governing Council at the next annual meeting.

It is further recommended that the program committee for the next annual meeting be requested to arrange meetings of a provisional section as a means of verifying the support which such a new section would have.

Dentistry must produce evidence next year (provided a meeting is held) that we should be on a par with the allied professions and other sections of the American Public Health Association.

The officers for the Oral Health Group for the ensuing year are C. R. Taylor, Michigan Department of Health, Lansing, Mich., chairman, and Walter J. Pelton, U. S. Public Health Service, Washington, D. C., secretary.

Besides the Wednesday morning and luncheon sessions, which were devoted exclusively to discussions of public health dentistry problems, dentistry was represented on the programs of several other sections throughout the American Public Health Association meeting.

Walter J. Pelton, of the U. S. Public Health Service, participated in a panel discussion at a joint session of the health officers, engineering and public health nursing sections. The subject of the panel was "Gearing Public Health to Meet Wartime Conditions."

Bion R. East, Columbia University, New York, N. Y., read a paper before the section on epidemiology entitled "Some Epidemiological Aspects of Dental Caries."

Ruth E. Martin, Washington University, St. Louis, Mo., presented a paper entitled "Dental Defects in Children" at a joint session of the Food and Nutrition Section and the American School Health Association.

The scientific, health and commercial exhibits were as numerous as those of previous years, although many of them were smaller and less pretentious than those of prewar days. The American Dental Association was represented in the Health Exhibit Section by Lon W. Morrey, director of the Bureau of Public Relations, with a fine exhibit of kodachrome transparencies depicting the history of dentistry.

As expected, this year's attendance was much smaller than usual. Nevertheless, more than 2,500 professional public health workers from every part of the United States, from Canada and from Latin American Countries registered. Great Britain was represented by several official delegates. The site and date of the next annual meeting were left to the decision of the executive board of the Governing Council.

DENTAL CONDITIONS IN WHITE AND INDIAN CHILDREN IN NORTHERN WISCONSIN

By LESLIE W. FOSTER,* D.D.S., M.S., C.P.H., Minneapolis, Minn.

WHENEVER the subject of dental health comes up for discussion, whether by a lay or by a professional group, invariably this question will be asked, "How do Indians' teeth compare with those of our white population?" It is obvious to the dental profession that this is a broad question, which, in casual conversation, can be answered only by a broad statement. In order to give a fair and intelligent answer to this question, it seemed necessary to find, if possible, an area wherein whites and Indians live under similar conditions of climate, society and economy, so that any comparison would be actual even though limited. Three areas in northern Wisconsin seemed to meet the requirements. The limited data derived from this small group would seem to carry more scientific weight than the use of previously assembled figures of larger groups.

There are numerous fallacies in the use of independent reports as material for such a comparison. Chief among these is the lack of truly comparable figures on the two groups. The most extensive dental survey made on children in the United States[1] derives 73 per cent of its data from examinations made east of the Mississippi River. On the other hand, it must be noted that the bulk of the Indian population (93 per cent)[2] is west of the Mississippi River. The value of any comparison of figures derived from two such geographically divergent sources would be questionable inasmuch as environmental conditions, i.e. climate, altitude, food and water supply, are generally believed to have a marked influence on the incidence of dental disease. As children of school age furnish the most readily available material for a dental survey, and particularly since dental caries is a disease of childhood, it is logical to look to school groups as a source of material for a comparison of Indian and white dental health.

In Northern Wisconsin, there are three areas, comprised of seven rural communities in four different counties, where the school population falls nearly equally into white and Indian groups. The children of these areas attend ten rural schools. Their natural environment is practically identical. Their food sources and water supply are similar. While the white children, as a whole, may have a slightly better artificial environment, i.e. housing conditions, and possibly more adequate diet, they also have the disadvantage of that "civilized" tendency to indulge in sweets. However, the data here presented appear to be suitable for comparison.

TABLE 1.—CLASSIFICATION OF CHILDREN EXAMINED

White		188
Indian		274
Full blood	140	
Three-fourths to less than full blood	19	
One-half to less than three-fourths	62	
One-quarter to less than one-half	17	
Less than one-quarter and those whose record was unavailable	36	
Total		462

During October, November and December 1941, 462 children between the ages of 6 and 16 inclusive (age figured to nearest birthday) were routinely ex-

*In charge of dental hygiene education, United States Indian Service.

TABLE 2.—INCIDENCE OF CARIOUS PERMANENT TEETH (D.M.F.) IN 462 WISCONSIN (RURAL) SCHOOL CHILDREN (274 INDIAN AND 188 WHITE)*

Age	Indian	Number Examined	D.M.F. per 100 Children	Age	White	Number Examined	D.M.F. per 100 Children
6	Boys	9	56	6	Boys	7	0
	Girls	9	11		Girls	4	25
	Total	18	33		Total	11	9
7	Boys	9	44	7	Boys	12	58
	Girls	22	91		Girls	8	75
	Total	31	77		Total	20	65
8	Boys	15	73	8	Boys	11	91
	Girls	11	45		Girls	8	188
	Total	26	62		Total	19	132
9	Boys	13	131	9	Boys	16	164
	Girls	20	170		Girls	12	192
	Total	33	155		Total	28	175
10	Boys	15	168	10	Boys	9	333
	Girls	16	218		Girls	14	307
	Total	31	197		Total	23	317
11	Boys	17	165	11	Boys	12	242
	Girls	16	175		Girls	15	194
	Total	33	170		Total	27	215
12	Boys	13	208	12	Boys	9	356
	Girls	20	385		Girls	12	367
	Total	33	315		Total	21	362
13	Boys	18	316	13	Boys	8	525
	Girls	13	500		Girls	10	382
	Total	31	393		Total	18	444
14	Boys	8	388	14	Boys	7	786
	Girls	12	417		Girls	4	275
	Total	20	405		Total	11	600
15	Boys	7	271	15	Boys	4	650
	Girls	6	433		Girls	3	567
	Total	13	346		Total	7	614
16	Boys	3	800	16	Boys	0	...
	Girls	2	800		Girls	3	567
	Total	5	800		Total	3	567
All Ages	Boys	127	195	All Ages	Boys	95	271
	Girls	147	243		Girls	93	266
	Total	274	221		Total	188	268

*Age 6 to 16 years and classified according to race, sex and age.

amined. Examinations were made in the school room with the examiner's back to a window and the child seated on a stool or chair facing the window, this position giving the best natural lighting possible. No. 4 plain mouth mirrors and sharp No. 23 explorers were used in the examinations. As the examinations were made over a fairly short period of time and by the same examiner (the writer), the variability of diagnosis[3] has been reduced to a minimum.

The 462 children were divided and classified[4] as shown in Table 1.

The figures indicate that the Indian children average approximately three-fourths Indian blood.

The 188 white children are representative of "run of the mill" rural American whites. The Indian children are principally Chippewa, Oneida and Potawatami, with a slight mixture of other tribes. Their white blood is similar to that of the white children, as many of the families are interrelated.

The average age of the Indian children at the time of examination was 10.4 years; that of the white children, 10.3 years (a difference of not more than six weeks). The average age of the Indian boys examined was 10.6 years; that of the white boys was an even 10 years. The average age of the girls was more nearly equal, the Indian girls' average being 10.3 years, the white girls' average 10.5 years.

Caries experience, or D.M.F. (decayed, missing and filled), employed in this article was introduced by the United States Public Health Service in 1938.[5]

Caries experience in permanent teeth starts at an earlier age among children of Indian blood, probably because of earlier eruption of their permanent teeth, than among white children. Table 2 shows how, in general, by age and sex, caries experience increases in the growing child. When a group of this size (462) is broken down into such small units as color, sex and one year age groups, the resulting number in each subunit is too small to be of accurate statistical importance, but nevertheless shows the general trend of the problem.

When the age groups in Table 2 are consolidated, it will be noted that the average caries experience (D.M.F.) for the white boys is 39 per cent greater than that of the Indian boys, athough the Indian boys are about seven months older

TABLE 3.—MODIFIED DENTAL CARIES INDEX* OF 274 INDIAN AND 188 WHITE CHILDREN

	Indian			White		
	Number Examined	Carious Surfaces	Average Caries Index	Number Examined	Carious Surfaces	Average Caries Index
Boys	127	499	3.92	95	471	4.96
Girls	147	690	4.69	93	458	4.92
Total	274	1189	4.34	188	929	4.94

*Bodecker, C. F.: Modified Dental Caries Index. J.A.D.A., 26: 1453-1460, September 1939.

TABLE 4.—INCIDENCE OF DENTAL CARIES WITH REFERENCE TO NUMBER OF D.M.F. TEETH PER CHILD HAVING ALL FOUR PERMANENT FIRST MOLARS ERUPTED

	265 Indian		173 White	
First Molars	No.	Per Cent	No.	Per Cent
1 D.M.F.	37	14.0	32	18.5
2 D.M.F.	60	22.6	38	22.0
3 D.M.F.	35	13.2	33	12.7
4 D.M.F.	39	14.7	44	25.4
Total with 1 or more D.M.F.	171	64.5	136	78.6
None carious	94	35.5	37	21.4
Total	265	100.00	173	100.0
Any Tooth				
1 D.M.F.	42	15.8	30	17.4
2 D.M.F.	47	17.7	33	19.1
3 D.M.F.	28	10.6	16	9.2
4 D.M.F.	19	7.2	28	16.2
5 D.M.F.	11	4.2	7	4.0
6 D.M.F.	11	4.2	10	5.8
7 or more	20	7.5	14	8.1
Total with 1 or more D.M.F.	178	67.2	138	79.8
None carious	87	32.8	35	20.2
Total	265	100.0	173	100.0

than the white boys chronologically and approximately one year physiologically older than the white boys; the white girls have only 9 per cent more D.M.F. teeth than the Indian girls, although the chronologic and physiologic age is approximately the same, and the average caries experience (D.M.F.) of the white children as a whole is 21 per cent greater than that of the Indian children as a whole.

If the modified dental caries index[6] is used, the picture changes slightly in favor of the white children. With this method of calculation, the white boys have a caries index 25 per cent higher than the Indian boys; the white girls have a caries index only 5 per cent higher than the Indian girls, and the average caries index of the white children of both sexes is but 14 per cent higher than the average for the Indian children of both sexes. Table 3 gives the details as to the modified caries index of the children included in this study.

The distribution of carious (D.M.F.) teeth was found to be nearly identical in both groups of children. The first molars, as would be expected, furnished the bulk of the teeth the surfaces of which were attacked by decay. In the white children, 69.54 per cent of all carious (D.M.F.) teeth were first molars, the remaining 30.46 per cent being distributed among the remaining teeth. In the Indian children, 69.64 per cent of all carious (D.M.F.) teeth were first molars and the remaining 30.36 per cent were credited to all remaining teeth. The 188 white children had 688 fully erupted permanent first molars (averaging 3.66 per child). The 274 Indian children had 1,062 fully erupted permanent first molars (averaging 3.88 per child). Of these fully erupted first molars, 50.9 per cent of those in white children's mouths were attacked by decay, while the incidence of carious (D.M.F.) first molars of the Indian children was 39.7 per cent.

A small number of the children examined did not have all four first permanent molars erupted, 8 per cent of the

TABLE 5.—OCCURRENCE OF MALOCCLUSION IN 462 WISCONSIN (RURAL) SCHOOL CHILDREN (274 INDIAN AND 188 WHITE)

Occlusion		Indian		White	
		Number	Per Cent	Number	Per Cent
Normal		147	53.7	96	51.0
Class I malocclusion	Very slight	12	4.4	8	4.3
	Slight	39	14.2	31	16.5
	Moderate	31	11.3	12	6.4
	Severe	1	0.4	1	0.5
	Total	83	30.3	52	27.7
Class II malocclusion	Very slight	2	0.7	2	1.1
	Slight	19	6.9	15	8.0
	Moderate	9	3.3	17	9.0
	Severe	1	0.4	0	0.0
	Total	31	11.3	34	18.1
Class III malocclusion	Very slight	3	1.1	0	0.0
	Slight	7	2.5	4	2.2
	Moderate	2	0.7	1	0.5
	Severe	1	0.4	1	0.5
	Total	13	4.7	6	3.2
Total malocclusion		127	46.3	92	49.0

white children and 3.3 per cent of the Indian children falling in this class. Of those children having all four permanent first molars erupted, a tabulation was made. This records the occurrence of one, two, three and four carious permanent first molars per child, as well as one, two, three, four, five, six and seven or more carious (any) permanent teeth per child. The greatest number of D.M.F. permanent teeth, sixteen, were found in a 13½-year-old white boy. A 14-year-old Indian girl was a close second with fifteen permanent teeth. The details of distribution are shown as Table 4.

A valid comparison of the teeth of these two groups should not be made without some mention of the surrounding soft tissues. As there was little difference, if any, in the gum condition of the two groups, no further mention will be made.

Malocclusion in these two groups was found to be more nearly equal than the incidence of dental caries. But here again the white children stood second, having 2.7 per cent more irregularities than the Indian children. This slight difference seems to indicate that these Indian children are approaching the "high state of civilization" that whites now enjoy.

Angle's classification[6] was used in recording the condition of the occlusion without regard to the subdivisions; i.e., only the occlusal relation of the opposing first permanent molars was considered. In the few cases in which none of the permanent first molars were erupted or no two opposing permanent first molars were erupted, the relationship of the jaws was determined by the occlusion of the second deciduous molars. In order to determine the severity of the malocclusion, four subdivisions were made in each class: very slight, any deviation not noticeable except on careful examination; slight, any deviation from the normal noticeable upon ordinary examination, but not of sufficient degree to interfere with mastication; moderate, slightly interfering with mastication, treatment recommended but not imperative; severe, marked irregularities, regulation being desirable either as a physical or a mental health measure. The results of this part of the examination are shown as Table 5.

CONCLUSION

The data presented herein indicate that Indian children living in the same communities with white children and under similar conditions are similarly attacked by dental caries and subject to malformation of the jaws but slightly less severe. This two-way comparison shows that the Indian children, for the present at least, have the advantage over the white children.

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218 Federal Office Building.

COUNCIL ON DENTAL EDUCATION

THE Council on Dental Education inaugurated a congress on dental education and licensure in February 1941 at a meeting held in Chicago. A second congress was held in February 1942 in Chicago. The fundamental purpose of the council in conducting such meetings was to bring dental examiners and dental teachers together for a discussion of common problems. The response of both examiners and teachers to this undertaking went far beyond the expectations of the Council.

The general feeling seems to be that it would be desirable to hold such a meeting each year. Owing to the present unsettled conditions, however, and because of the difficulties of travel, the Council has determined not to undertake to conduct a congress in 1943, but proposes to continue this effort when conditions warrant it.

REPORT OF THE COUNCIL ON DENTAL EDUCATION

To the House of Delegates of the American Dental Association:

This report of the Council on Dental Education to the House of Delegates of the American Dental Association covers the year ending June 30, 1942. Four meetings of the Council were held during the year as follows:

Houston, Texas . . October 24, 1941
New York City . . January 17, 1942
Chicago . . . . . February 22, 1942
Chicago . . . . . June 21, 1942

During the year, Arthur C. Wherry of Salt Lake City was re-elected for a term of three years by the House of Delegates and Leroy M. S. Miner of Boston and William N. Hodgkin of Warrentown, Virginia were reappointed for terms of three years, respectively, by the American Association of Dental Schools and the National Association of Dental Examiners. Roy O. Elam of Nashville was appointed for one year by Oren A. Oliver, President of the American Dental Association, to fill the vacancy caused by the resignation of Walter M. Morgan of Nashville. M. Webster Prince of Detroit succeeded Minor J. Terry of Albany, N. Y. as Chairman of the Council and William N. Hodgkin succeeded J. Ben Robinson of Baltimore as Vice Chairman.

The annual *Dental Students' Register* covering enrollment in the thirty-nine dental schools in the United States as of October 15, 1941 was issued in due course. Salient facts recorded in the Register may thus be enumerated:

A total enrollment was reported in the thirty-nine schools of 8,980 students distributed as follows: 8,355 undergraduates, an increase of 635 over the previous year; 22 specials; 90 graduate students; 186 postgraduate students; 327 dental hygienists.

The pre-dental education of the 8,355 undergraduates was reported as follows: with less than two years of college work, 18; with two years, 4,183; with three years, 1,510; with four years without a degree, 320; with a bachelor's degree, 2,203; with other degree, 121. Correspondingly, the predental education of the first year class, numbering 2,476, stood as follows: with two years of college work, 1,162; with three years, 526; with four years without a degree, 140; with a bachelor's degree, 626; with other degree, 22.

Graduates for the year ending June

30, 1941, numbering 1,568, were reported with pre-dental education as follows: with less than two years of college work, 74; with two years, 713; with three years, 233; with four years without a degree, 41; with a bachelor's degree, 456; with other degree, 51.

The geographical distribution of students showed enrollments from every state in the Union, the largest number, 1,819, being from New York and the smallest, 4, being from Nevada.

A detailed analysis of the formal applications for admission to the thirty-nine dental schools in the United States was made and the results reported to the schools as follows:

Number applying to one school only, accepted and in attendance	1,800
Number applying to more than one school, accepted and in attendance	676
Number applying to one or more schools, accepted and not in attendance	321
Number applying to one or more schools, refused admission by all schools	553
Total number of formal applications	3,350

Thus it is seen that 2,476 applicants were accepted and enrolled, 321 applicants were accepted and did not attend, and 553 applicants were rejected by all schools to which they sought admission.

A brochure of seventy-two pages on "Dentistry as a Professional Career," preparation of which was announced in last year's report, was completed and distributed. The demand for the brochure has been so great that it has been necessary to print two editions of 5,000 copies each. It is widely sought by prospective students, guidance officers and reference libraries. It has been distributed without charge on individual requests and a charge of ten dollars per hundred has been made to dental schools desiring the brochure in quantities.

One of the most hopeful aspects of our modern American life is the eager enthusiasm of millions of our youth to fit themselves through the discipline of education and special training for lives of usefulness. The choice of a trade, or business, or profession in a country where the ideal of self-support and economic independence prevails, is a tremendously important issue. Countless fathers and mothers, young men and women, and guidance and personnel officers in high school and college wrestle with this question year by year. The Council is in constant receipt of inquiries from all these sources concerning the basis of a sound education in dentistry, the schools in which satisfactory predental education may be secured, the cost of such an education, the requirements and conditions of dental practice, the organization and literature of the profession, and the material and professional rewards it offers.

With the sole purpose of helping parents, youth and guidance officers fairly to appraise the field of dentistry and the opportunities it offers for a happy and fruitful career, the Council feels it desirable to keep this brochure and subsequent revised editions of it available for distribution at all times. The Council is not engaged in recruiting students or in the mere multiplication of numbers in the dental schools. It does believe that enlightened society in the years ahead will greatly enlarge the dental service which the public now receives, and that young men and women with good health, with proven scholastic ability, with a genuine bent toward scientific endeavor and with the desire to serve humanity in a career which promises reasonable material rewards and great professional satisfaction, need not hesitate to study dentistry. The Council hopes that this brochure may help many young men and women to

determine wisely the choice of a career.

The First Congress on Dental Education and Licensure conducted by the Council at Chicago in February, 1941 met with a response from the deans and faculties of dental schools and from members of state boards of dental examiners quite beyond the hopes and expectations of the Council. Accordingly, a Second Congress was held in Chicago in February, 1942. The response to this second effort was likewise encouraging. The desire now seems widespread that the Council should conduct an annual meeting with the major purpose of effecting and maintaining closer coordination and articulation between dental teaching and dental examining for licensure.

The morning session of the Second Congress was devoted to discussion of the general topic, "How can obsolete procedures and processes in dental teaching and in dental examining be eliminated and how can teaching and examining be more closely articulated?" Charles F. Bodecker of Columbia University presented a paper from the "Teacher Approach" and Philip L. Schwartz, former member of the New Jersey Board of Dental Examiners, from the "Examiner Approach." The luncheon session was addressed by Franklyn Bliss Snyder, President of Northwestern University. The afternoon session was devoted to discussion of the general topic, "The Design of the Dental Curriculum." Howard M. Marjerison, Dean of the College of Dentistry of the University of Illinois, presented a paper dealing with the special topic, "By Integration with Medicine," and Willard C. Fleming, Dean of the College of Dentistry of the University of California, presented a paper dealing with the special topic, "By Autonomy in Administration and Teaching."

In both the morning and afternoon sessions, the presentation of the formal papers was followed by open discussion from the floor. Some twenty-five deans, dental teachers, state board examiners and others participated in the discussion. All but four of the thirty-nine dental schools were represented and thirty-three deans were in attendance. About thirty state boards of examiners were represented by one or more members. The Proceedings have been published and distributed.

The Council was proceeding systematically with its announced plans for the establishment of a list of approved dental schools when the declaration of war in December, 1941, raised many new questions. On January 3-4, 1942, a conference of college and university presidents was held at Baltimore to consider what the higher and professional educational institutions could do to aid in the common defense and in the prosecution of the war. A series of resolutions were adopted pledging the cooperation of the institutions with the Government and proposing that all colleges and universities, so far as practicable, employ the summer months to accelerate their programs of study during the emergency and thus save time for all students. It was also proposed that studies be made of the added expense to which both institutions and students would be put in pursuing accelerated schedules.

The Council gave serious consideration to the question of acceleration in dental education at its meeting on January 17, 1942 and recommended that "accelerated programs be adopted for the period of the war in those cases where dental schools are able to do so without loss in the effectiveness of their work." The Council also urged that the usual predental and professional requirements be maintained and that every effort be made to preserve the integrity of the teaching and the quality of the research. It was also suggested that plans for accelerated programs should make the transition from the regular four-year schedule with the least possible confusion and should

permit an easy return to a four-year schedule at the end of the emergency.

Thirty-six of the thirty-nine dental schools in the United States have announced the revision of their schedules so as to enable their students to complete the usual course covering four academic years in three calendar years. All students in these schools already enrolled will be kept in continuous attendance, with short breaks between terms, until graduation. Twenty-four schools are receiving their first new classes under the accelerated schedule in May, June and July, 1942, and twelve schools are receiving their first new classes in September or October, 1942.

The Wartime Commission of the Office of Education at Washington, D. C. made a study of the added cost of acceleration to institutions and students and has recommended a Federal appropriation to meet the expense. The Council canvassed the dental schools to discover the amount earned by dental students to help themselves in meeting the expenses of a dental education. It was thought that such data might aid the Wartime Commission in determining the amount to be included in its request as a possible basis of loans to dental students. It was found that 72% of the total enrollment of undergraduate dental students carry on some work to aid themselves while they are studying dentistry. About three-fourths of their earnings are accumulated during the summer months and one-fourth during the academic year. It was also found that the students who do such work earn on the average $343.00 per year. This investigation clearly indicated that dental students earn about $2,000,000.00 annually. This figure was employed by the Wartime Commission in its representations to the Office of the Budget at Washington. It was more difficult to get at the possible extra expense to institutions; but the Council is assured that if and when Federal funds are provided for these purposes, dental schools will be given consideration along with other professional schools.

All these hurried changes in procedure naturally raised the question as to whether or not the Council should begin in September, 1942, the inspection of dental schools seeking its approval. Both dental schools and state boards of examiners were canvassed. The majority of the schools and practically all of the boards felt that the Council's plans should go forward uninterruptedly in spite of the emergency. The Council, therefore, is proposing to go forward with its difficult task with the nation at war and with nearly all the dental schools operating on accelerated schedules. A series of blanks calling for detailed documentary data were issued before the declaration of war and have largely been returned. The Council will collate the data thus secured and employ them as a basis for the inspection of the schools which will be begun in September, 1942. The Council hopes that the care it proposes to take in prosecuting this task in a time of emergency may even help to sustain the standards of dental education which have been attained through the years. The Council also hopes that the list of approved dental schools it plans to establish will command the respect of other accrediting agencies, of dental and college educators, of boards of examiners and of the entire dental profession.

Respectfully submitted,
M. WEBSTER PRINCE, *Chairman,*
WILLIAM N. HODGKIN, *Vice Chairman,*
LEROY M. S. MINER,
ARTHUR C. WHERRY,
JOHN T. O'ROURKE,
ROBERT P. THOMAS,
ROY O. ELAM,
J. BEN ROBINSON,
MINOR J. TERRY,

HARLAN H. HORNER, *Secretary.*

COMMITTEE ON DENTAL MUSEUM

REGISTRY OF DENTAL AND ORAL PATHOLOGY

THE ATLAS OF DENTAL AND ORAL PATHOLOGY

THE Atlas of Dental and Oral Pathology is a publication containing pertinent data on pathologic lesions of the oral cavity. It has been compiled from material submitted to the Registry of Dental and Oral Pathology at the Army Medical Museum.

The publication of the Atlas of Dental and Oral Pathology is sponsored by the American Dental Association through the Committee on Dental Museum. A first edition was prepared by Col. James B. Mann, DC, U. S. A., while serving as dental pathologist to the Registry of Dental and Oral Pathology and by Col. J. E. Ash, MC, U. S. Army, curator of the Army Medical Museum. This printing was soon exhausted and a second revised edition was prepared by Maj. Joseph L. Bernier, DC, U. S. Army, while serving as pathologist to the registry.

In the first edition of the Atlas, the illustrations were actual prints from photographic negatives, but the high cost of publication limited its distribution. By using a multilithographic process, it has been possible not only to enlarge the second edition, but also to reduce the price from $15 to $5. Some of the plates of the second edition do not show details as well as photographs, but the accompanying written discussion provides sufficient information to afford an understanding of the lesion.

The second edition contains, as an introduction, several pages that are concerned with dental and oral histology and embryology. These should serve as an excellent review and will add considerably to a more complete understanding of the various pathologic lesions. The remainder of the Atlas is concerned with all types of dental and oral diseases. A brief clinical history and a more detailed discussion of the microscopic findings is given for each case. This is accompanied by a multilithographic illustration of a histologic specimen, and specific references to the important features are given in the text. In most instances, both high and low power magnifications are used.

Obviously, all lesions cannot be presented in the Atlas, but by a careful selection of material from approximately 2,800 cases that have been registered, the principal dental and oral conditions are included and the scope of the book is very broad. In addition, new cases have been introduced covering diseases of the pharynx, since these conditions are observed frequently in an oral examination.

It is an extremely valuable book for study by any one interested in pathology; as a teaching aid in departments of pathology, or as a reference book in a medical or a dental library.

Should you want a copy of the Atlas, fill out the following form and forward it to the American Dental Association.

HENRY A. SWANSON, *Chairman*,
Dental Museum Committee

American Dental Association
212 East Superior St.
Chicago, Ill.

Enclosed is $5 for one copy of the "Atlas of Dental and Oral Pathology."

Name_____

Street_____

City_____ State_____

COMMITTEE ON LEGISLATION

INCOME TAX OF DECEDENTS

AN odd angle of the income tax law regarding dentists and other professional men has recently been changed to the advantage of dentists and others. The situation arose out of the fact that it has been the usual practice of dentists to report their income taxes on the basis of cash received during each year for work performed in that year and also to report the cash received each year for work done in previous years, but paid for in that year; a method called the cash receipt basis.

Difficulty arose, however, in determining what income tax a professional man would owe at the time of his death on income which he had earned in his lifetime, but which he had not yet received at the time of his death, and on which, therefore, no income tax had been paid.

Under the original tax laws, all professional services that had been performed on a credit basis and were unpaid at the time of the dentist's death went to his estate free of any income tax.

In 1934, Congress wished to collect an income tax on this income and hence changed the law by adding to Section 42 (a) of the Revenue Act the following words: "In the case of the death of a taxpayer there shall be included in computing net income for the taxable period in which falls the date of his death, amounts accrued up to the date of his death if not otherwise properly includible in respect of such period or a prior period." The effect of this change was to put the cash receipt taxpayer on the accrual basis for the income tax due for the taxable period in which fell the date of his death, and this change in his tax status was automatically forced on the taxpayer only by reason of his death.

In discussing the past history of this situation, the United States Court of Appeals for the District of Columbia stated:

> From its very terms, and as is clearly expressed in the reports of the congressional committees handling the legislation, it is evident that Section 42 (a) found its way into the tax law for the purpose of preventing ordinary income from escaping taxation. Previously, whenever a taxpayer on a cash receipts and disbursement basis died, income accrued up to his death passed to the estate as a part of the corpus, escaping the income tax mill altogether. Section 42 (a), enacted to cover the situation, "includes" in taxable income "for the taxable period in which falls the date of his (taxpayer's) death, amounts accrued up to the date of his death."
>
> Thus the taxable income for such period is the income the taxpayer actually received, plus the income accrued but not received. The objective of Congress, which must always be kept in mind, is that the net income of the taxpayer, prior to his death, bear the burden of income taxes . . . and that the income accrued should be added to the income actually received.

In discussing the intention of Congress, the District Court of Appeals for the Fourth District said: "It was the intention of Congress in enacting Section 42 (a) to reach all income earned during the life of a decedent that would otherwise escape the income tax."

The hardship of this law on dentists as well as other professional men lay in the fact that, in the event of his death, all of his outstanding book accounts due and unpaid to him at the time of his death were lumped together and added to his cash income for the last year of his life.

It was the practice to value these outstanding book accounts at their true net worth, and in one case this value was set at one-fifth of their face value; yet, in many cases, even this resulted in a substantial increase in the reportable in-

come. Thus, not only was the amount of the tax increased by this addition to his cash income, but also, because it increased the amount of the reportable income, it forced it into a much higher tax bracket, which, in turn, greatly increased the rate of taxation on all of the income, including cash income as well as accrued income. In the last few years, this has worked an extreme hardship on the estates of decedents.

In order to protect their heirs and estates, many professional men took out extra life insurance policies for the express purpose of having special funds available at the time of their death to meet this contingency.

Under the new Revenue Act of 1942, however, Congress has completely changed the law regarding the accrued income in respect of decedents. The last sentence of Section 42 (a), which is the one quoted above, is amended to read as follows: "In the case of the death of a taxpayer whose net income is computed upon the basis of the accrual method of accounting, amounts (except amounts includible in computing a partner's net income under Section 182) accrued only by reason of the death of the taxpayer shall not be included in computing net income for the period in which falls the date of the taxpayer's death." Thus, Congress has eliminated the hardship of the former law by relieving the estate of a decedent from any income tax on the accrued income of the decedent, and, in lieu thereof, it has provided that an income tax shall be levied on this accrued income when and as it is received by the heirs or beneficiaries of the decedent.

It is to be noted that these amounts of accrued income might consist of other items besides professional services; such as capital gain and interest on monies loaned, and the law provides that these amounts shall be considered, in the hands of any person who acquires them by bequest, devise or inheritance from the decedent, to have the same character that they would have had in the hands of the decedent if he had lived to receive such amounts. The recipient of them will have to pay an income tax on them for the taxable year in which he receives them.

According to another provision, if an estate tax or an inheritance tax is paid by the estate of the decedent on the accrued income, when the recipient of the accrued income reports it on his income tax he shall be allowed a deduction by reason of the inheritance tax that has already been paid on it, and Section 126 sets up a method for computing this deduction.

The new law provides that, in the case of the income tax returns of decedents, the new amendments shall be applicable with respect to taxable years *beginning* after December 31, 1942; and that, in the case of the income tax returns of recipients of accrued income of decedents, the new amendments of this section shall be applicable with respect to taxable years *ending* after December 31, 1942.

THE LAW MADE RETROACTIVE

The law also provides that in case the taxable period, in which falls the date of the death of the decedent, began after December 1, 1933, and before January 1, 1943, the tax for such taxable period shall be computed as if the new provisions were part of the Revenue Act of 1934 and all following Revenue Acts; provided there are filed with the commissioner signed consents, made under oath by the fiduciary representing the estate of the decedent and by each person who is a recipient of such accrued income. If such consents are filed, there is a provision for a refund if the taxes heretofore paid would amount to an overpayment under the new law.

The Revenue Act of 1942 was approved by the President, October 21, 1942.

REPORT ON MAIL-ORDER DENTURE BILL

THE Committee on Legislation reports that the bill to prohibit the transportation of mail-order dentures in interstate commerce has been passed by the House of Representatives and is now before the Senate. There, it was amended to eliminate the advertising feature and then it was approved by the subcommittee, and its future steps will be to be approved by the full interstate commerce committee and then brought on the floor of the Senate. After approval there, it will be sent back to the House for concurrence in the amendment, and then it will be sent to the President for his signature, when it will become law. The dental profession was kept fully informed as to the status of this bill from time to time.

VALIDITY OF STATUTES REQUIRING OWNERS AND OPERATORS OF DENTAL OFFICES TO BE LICENSED DENTISTS

By LESLIE CHILDS, Indianapolis, Ind.

THE question of the validity of statutes requiring owners and operators of dental offices to be licensed dentists has been the subject of much litigation. The principal attack upon such enactments has been based on the broad ground that they constitute an unconstitutional interference with the right of every one to own and control property.

However, by the weight of recent authority, provisions of this character in dental practice statutes have been upheld. And, as an example of judicial reasoning on what may be termed the majority rule, State *vs.* Williams, 211 Ind. 186, 5 N.E. (2d) 961, 1937 is in point. Here the Indiana statute, in defining the practice of dentistry, in part provided that "any person shall be said to be practicing dentistry within the meaning of this act who . . . owns or operates a dental office, or is the manager or conductor of the same."

The defendant was charged under the foregoing provision with practicing dentistry without a license. The lower court found for the defendant. The state appealed, raising the question of the validity of the quoted provision which, in effect, forbade an unlicensed person to own or operate a dental office. Here, in reasoning thereon, and in reversing the judgment below, the court, among other things, said:

> The profession of dentistry is not a business, but one of the learned professions which require long years of study before one is capable of practicing the profession. It is not a business where one can procure a room and a manager to run same. Before one may practice dentistry, he must pass a rigid examination and secure a license or permit to practice.
>
> If a person alone, or an association of persons, who fail to have the necessary learning to pass the dental examination, can own, manage, and operate a dental parlor with a licensed dentist in charge, then all the statutes regulating the practice of dentistry would be of no effect. The standards and ethics of the dental office, the class of workmanship, and the price would be regulated by the owner or manager. . . .

If one who is not qualified and licensed to practice is permitted to select and rent an office, and then employ licensed dentists to do the actual work, upon either a commission or a salary basis, he would certainly be doing a dental business, and would be doing indirectly what he could not do directly. . . . We are of the opinion that none of the provisions of the dental act complained of . . . violates any provisions of the State or Federal constitution. . . . Judgment reversed.

A like conclusion was reached in Parker *vs.* Board of Dental Examiners, 216 Cal. 285, 14 Pac. (2d) 67, which involved a construction of the California dental statute. The statute here, among other things, provided that "any person shall be understood to be practicing dentistry within the meaning of this act who . . . (5) manages or conducts as manager, proprietor, conductor, lessor, or otherwise a place where dental operations are performed."

The plaintiff controlled a number of corporations which, among other things, leased and supplied a chain of dental offices, under various contractual arrangements. The instant action involved the question of whether the plaintiff's method of doing business constituted the practice of dentistry within the meaning of the quoted provisions of the statute. The plaintiff contended that its business concerned merely the business side of the practice, and therefore the section of the statute invoked did not apply thereto. The trial court denied this contention, and the higher court in affirming the judgment rendered below, in part, said:

THE REASONING OF THE COURT

The appellant [plaintiff] claims that there is a distinction between the practice of dentistry which the statute undertakes to regulate and the purely business side of the practice; that the first requires skill and learning, while the latter requires only training in business transactions, and if the management or conduct of the "business side" by a layman is inhibited by statute, then the inhibitions of the statute are beyond the scope of the police power of the state, and are void as being unconstitutional. . . .

We are not prepared to hold with the contention that a corporation or an unlicensed person may not be prevented from managing, conducting, or controlling what [plaintiff] terms the "business side" of the practice of dentistry. The law does not assume to divide the practice of dentistry into that kind of departments. . . . The subject is treated as a whole.

If the contention of appellant [plaintiff] be sound, then the proprietor of the business may be guilty of gross misconduct in its management and violate all standards which a licensed dentist would be required to respect and stand immune from any regulatory supervision whatsoever. His employee, the licensed dentist, would also be immune from discipline upon the ground that he was but a mere employee and not responsible for his employer's misconduct. On grounds of public policy such a condition could not be countenanced. . . .

The practice of dentistry is not open to commercial exploitation. Such would be its fate if the methods adopted by petitioner [plaintiff] should become general. That a corporation may not engage in the practice of the law, medicine, or dentistry is a settled question in this state. . . . Judgment affirmed.

So too, in the People *vs.* Carroll, 274 Mich. 451, 264 N.W. 861, which, by the way, was reviewed in an article in THE JOURNAL several years ago, the court upheld a statute requiring a license to practice dentistry as a condition to ownership, or operation, of a dental office. The defendant was charged with violation of the statute on the grounds that he was a partner in the operation of a dental office, and did not have a license to practice. In upholding that statute, and in affirming the conviction of the defendant, the court, in part, reasoned:

The next question that presents itself to us is the validity of a regulation requiring the owner or operator of a dental parlor to be a licensed practitioner. . . . It is a well-known fact that in the profession of dentistry the services rendered are personal and call for knowledge in a high degree, and that to separate this knowledge from the power of

control, is an evil, the correction of which was attempted by the instant legislation. The evils which arise from divorcing the "power of control" from "knowledge" apply with equal force to a partnership as well as a corporation. . . .

[We] think it within the police power of a state to control and regulate the ownership and operation by a firm of a dental parlor as well as to prescribe the qualifications of those who engage in its practice. . . . We, therefore, hold that the respondent [defendant] being engaged in the operation of a dental parlor was engaged in the practice of dentistry contrary to the above act. Judgment of conviction is affirmed.

CONCLUSION

The foregoing cases cut squarely across the case law of the subject in hand, and fairly represent the reasoning followed by the great weight of authority. True, there is some authority to the contrary, for example, State *vs.* Brown, 37 Wash. 97, 79 Pac. 635, decided in 1905. But this case does not appear to have been followed in other jurisdictions, and, it seems, stands alone in the denial of the validity of statutes requiring a license to practice dentistry of one owning or operating a dental office.

On the other hand, the cases reviewed herein are all of comparatively recent date, and, under their holdings, there can be no doubt of the validity of restrictive statutes covering the ownership and operation of dental establishments. These holdings constitute pat illustrations of the case law today as well as the trend of judicial authority on the question involved.

1520 East Tenth Street

ALPHA OMEGA FRATERNITY PRESENTS THREE AMBULANCES TO THE UNITED STATES ARMY

THREE ambulances were presented to the United States Army by the Alpha Omega Fraternity, after a luncheon ceremony at the Mayflower Hotel in Washington, D. C., August 15, 1942. Brig. Gen. Ralph H. Mills, chief of the United States Army Dental Corps, accepted the gift, which the national president, Meyer Eggnatz, of Baltimore, presented for the fraternity.

Thomas Parran, Surgeon General of the United States Public Health Service and recipient of the 1938 Alpha Omega Achievement Medal, presented annually for "Meritorious Contribution to the Art and Science of Dentistry," was the principal speaker. He spoke of the tremendous postwar task that lies ahead for American medical and dental professions. War and its concomitant forces of destruction; disease, undernourishment and starvation, mental and nervous distresses —these will leave their mark on the postwar human being, and America's health forces will be assigned the job of bringing the world back to normal health.

Alpha Omega, with almost 350 of its membership already stationed in various parts of the world on active duty, had earlier, before the entrance of the United States into the conflict, presented a complete mobile unit to the Canadian Dental Corps at services held in Toronto.

PAN AMERICAN RELATIONS COMMITTEE

CONTRIBUTION OF THE DENTAL PROFESSION TO CONTINENTAL SOLIDARITY AND UNDERSTANDING*

By DANIEL F. LYNCH,† D.D.S., Washington, D. C.

THE dental profession is extremely fortunate in that it can contribute to international understanding and friendship in a war-torn world. This is possible through the exchange of our dental literature and the visits to foreign countries which dentists have always made to acquire new knowledge and ideas from their distant colleagues. For example, I have many personal friends in every country of Europe and South America and in some parts of Asia. I consider myself wealthy because of these friendships and know that they will grow stronger and richer as the years go by.

Because we are Americans, we have a common New World attitude and outlook, but distance has made it difficult for us to know each other. We have gone through the last 200 years with little knowledge of each other's thoughts, customs and traditions. The future presents a different picture and perhaps for us a better one. The day of competitive nationalism and nationalistic thought has passed into the larger and greater realm of continental thought and hemispheric cooperation. The Americas are rich in minerals and all of the basic necessities of life. Some of our countries have more of these basic materials than others. Therefore, it is necessary to develop an exchange and obtain a fair distribution of these things so that we may all live in happiness and peace. To accomplish this exchange requires understanding and knowledge of one another. This is where the dental profession of each country can play a significant rôle.

First, we all have a common language of dental and anatomic terms. This language should be extended and coordinated so that more words are identical in English, Spanish and Portuguese.

Secondly, we have the same daily problems in practice, regardless of whether we practice in New York, Mexico City, Lima, Peru or Buenos Aires. Many of our patients come to us in pain and usually with insufficient money to pay for the work to be accomplished. The dental materials that we use must be of the finest quality and yet each of us has had the experience of being supplied with inferior dental materials, which has made our work difficult. The American Dental Association has endeavored to protect its members against this practice by establishing specifications for dental materials under its Research Commission. It has given the dental profession of the United States a great deal of happiness to realize that our brother practitioners in the other countries of America have seen fit to use these lists

*Read in absentia at the II Jornadas of the Sociedad Argentina de Ortodoncia, held in conjunction with the IX Jornadas of the Asociación Odontológica Argentina, during the first two weeks of October 1942.

†Chairman, Pan American Relations Committee, American Dental Association.

of certified materials in their daily practice.

Because of the unfavorable money exchange, it has not been possible for the dentists of Latin America to visit frequently in the United States. Nor has it been possible for them to buy current American textbooks. On the other hand, the average North American dentist usually takes only a two or three week holiday annually and this short time does not enable him to visit Latin America.

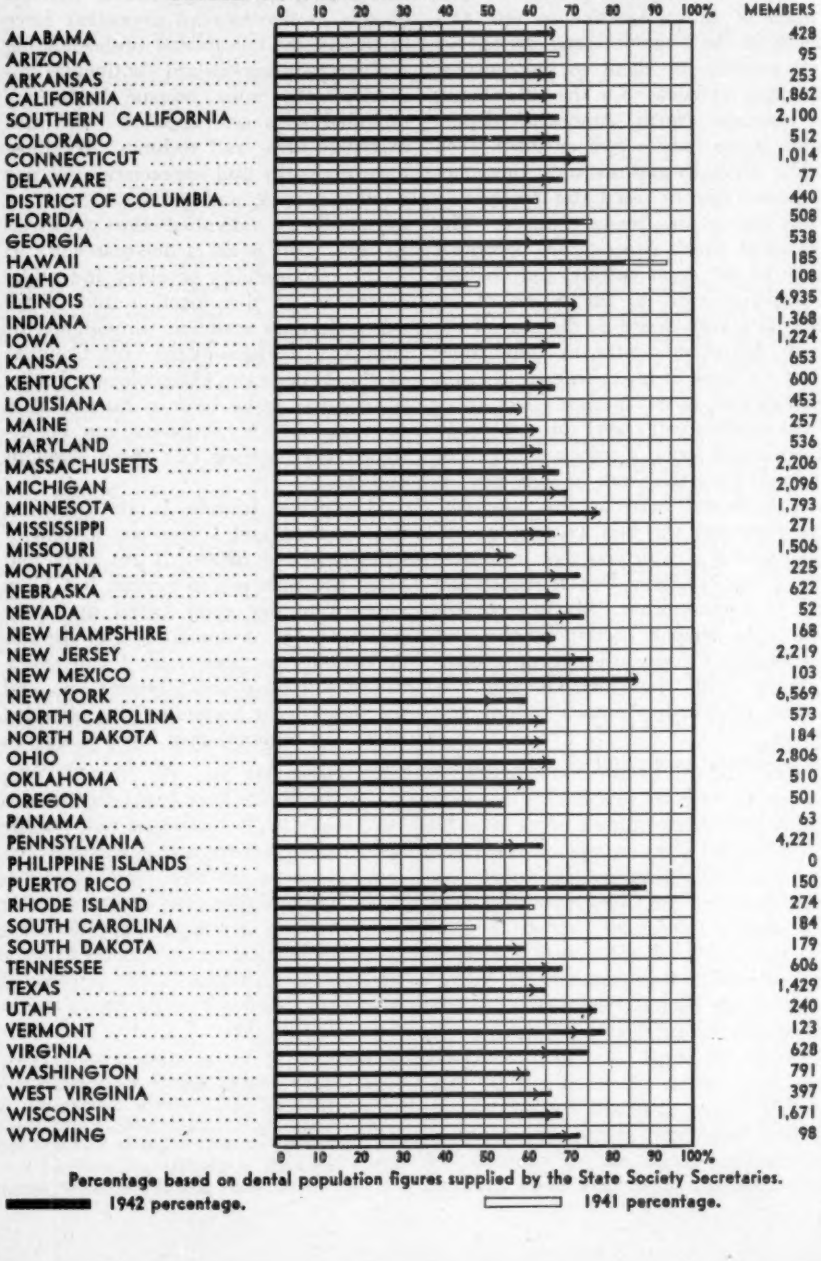
But this is now being changed. The dentists of North America are becoming aware of the great culture and civilizations which exist to the South of us. There is a keen desire on the part of the North American dentist to know more about the work of his colleagues in Latin America and, as this interest grows, more of our dentists will travel through South America and spend a sufficient length of time watching the work of such men as those gathered here at this assembly. You represent the best type of practitioner and it is with you that the members of the American Dental Association wish to communicate. Much good can be done by personal correspondence, and it is suggested that you endeavor to communicate with those friends and colleagues in North America whom you admire.

The dental profession of any country is only a small segment of its population, but because of its daily contacts, it can exercise a tremendous force toward understanding any given problem. Because of this, it becomes an important force in developing continental understanding and contributing toward continental solidarity. We must become better acquainted with one another. We must exchange ideas and technics. We must have sympathy and appreciation for one another's work and problems, and we must make an individual effort to express all this. This is not a one-man job! It is the responsibility of every individual assembled at this meeting and of all our colleagues scattered throughout the Americas. Perhaps at the Fifth Congress of the Federación Odontológica Latino Americana, to be held in Buenos Aires in 1944, definite programs can be designed for carrying out these thoughts and ideals.

Gentlemen, friends, I salute you on this occasion and I give you a toast of fellowship and regard. I am sorry that I am not with you in person, but I am grateful to our good friend and your president, Dr. Armando Monti, for this opportunity to greet you. I can assure you that I have not forgotten you and the magnificent hospitality you extended to me last summer when I was in Buenos Aires.

Membership Page

PERCENTAGE OF DUES RECEIVED IN CENTRAL OFFICE AS OF OCTOBER 31, 1942, AS COMPARED TO 1941 MEMBERSHIP



Percentage based on dental population figures supplied by the State Society Secretaries.

1942 percentage. 1941 percentage.

NEWS ITEMS

THE JOURNAL OF ORAL SURGERY PRELIMINARY ANNOUNCEMENT

THE American Dental Association's newest publication, the long awaited and much discussed *Journal of Oral Surgery*, will be launched early in January 1943. It is being published in response to a demand for a journal devoted exclusively to oral surgery and allied subjects.

The *Journal of Oral Surgery* will present original manuscripts on the subject of oral surgery, including pathology, oral diagnosis, operative procedures and selected surgical, medical and therapeutic subjects. Special departments will be devoted to case reports, abstracts, book reviews and notices of society meetings and programs.

Although the new journal will be devoted exclusively to oral surgery, it will by no means be exclusively an oral surgeons' publication as it is the intention of the editorial board to select and publish practical, well-illustrated articles that will be beneficial to the general practitioner of dentistry as well as to the specialist.

L. Pierce Anthony is editor in chief and Carl W. Waldron of Minneapolis, Minn., editor of the *Journal of Oral Surgery*. Members of the editorial board are: Theodor Blum, James R. Cameron, J. Orton Goodsell, V. H. Kazanjian, Howard C. Miller and Douglas B. Parker.

Starting as a quarterly, the *Journal of Oral Surgery* will be developed into a monthly as rapidly as subject material permits.

The annual subscription price is $5.

A formal announcement and complete details regarding the new journal will be published in the January 1, 1943 issue of THE JOURNAL.

INSTITUTE OF WAR MEDICINE AND SURGERY

MORE than 650 dentists from twenty-nine states attended the four-day sessions of the Institute of War Medicine and Surgery for Dentists sponsored by the Chicago Dental Society and held in the John B. Murphy Memorial Hall of the American College of Surgeons in Chicago, October 26-29.

The sessions of the institute were designed to "help prepare members of the dental profession for the realities of war, because those who have known war at first hand assure us that the dental officer must function in a wider capacity than the dentist in civilian life."

There were twenty-five assigned lecturers on the regular program, and four unscheduled lecturers, including James E. Paullin, president elect of the American Medical Association and president of the American College of Physicians, and Frank H. Lahey, chairman of the Procurement and Assignment Service.

The program of the institute was divided into four sections: (1) topics of a background nature to aid dentists in understanding the larger issues involved in global war; (2) topics of an essentially military nature; (3) topics of a basic medical nature, and (4) topics of a strictly dental nature, with direct relationship to the rôle of modern dentistry in war.

The Monday lectures devoted to the background subjects, such as the geography of the battle areas, weather con-

ditions in the zones of combat and the cultural patterns of our enemies, were given by members of the faculty of Northwestern University. Recruitment of dental officers and their training in both the Army and the Navy were explained by Lt. Col. R. F. Olmsted, MC, U. S. Army; Capt. J. A. Tartre, DC, U. S. Navy; Col. Arnett Matthews, DC, U. S. Army; and Com. Fred F. Molt, DC, U. S. Navy.

A feature of the opening day's sessions was a realistic demonstration, including sound effects, by three officers and thirty men from the Medical Replacement Center, Camp Grant, Ill. This demonstration included first aid on the field and covered the complete activities of a battalion aid station during conflict. It also included military customs and courtesies.

During the Tuesday sessions, papers were presented on tropical medicine, traumatic surgery, military sanitation, aviation medicine, military psychiatry and nutrition in wartime. Harry A. Oberhelman, successor to John B. Murphy on the staff of Mercy Hospital and head of the Loyola University School of Medicine department of surgery, explained that new technics are aiding the war surgeon in caring for types of wounds never before encountered. He discussed in detail the treatment of shock, hemorrhage and burns, and the use of blood plasma and of the sulfonamide drugs.

At the Tuesday evening session, a graphic description of the sinking of the U.S.S. *Yorktown* was given by Lt. D. D. Jackson, who was a dental officer aboard the carrier when it was lost in the battle of Midway.

The Wednesday lectures continued the subjects introduced on Tuesday. In his discussion of military psychiatry, Carel Van der Heide, former professor of psychiatry at the University of Rotterdam and now of the Institute for Psychoanalysis, Chicago, declared that because they are under severe physical strain, men of the armed forces may as frequently suffer a mental breakdown as a result of bad news from home as from events on the battlefield. He explained that war neurosis is not a clinical entity, but a neurosis which, just as a peacetime psychoneurosis, has endogenic as well as exogenic factors.

In discussing traumatic surgery, Kurt H. Thoma, professor of oral surgery, Harvard University, said that "treatment of the patient's general condition is of first importance," adding that reports from England show that 60 per cent of the deaths in bombed areas result from shock.

The Thursday sessions were given over to prosthetic services in war and oral surgery in war under the following specific subject headings: "The Use of Acrylics in the Construction of Splints and in Maxillofacial Prosthesis," by Percy C. Lowery, of Detroit, Committee on Surgery, National Research Council; "Facial Reconstruction," by Arthur H. Bulbulian, Rochester, Minn., the Mayo Clinic; "Aviation Splints," by Glenn E. Willhelmy, Kansas City, Mo.; "Local Anesthesia Under War Conditions," by John Jacob Posner, New York, N. Y., author of the Manual of Local Anesthesia for the U. S. Army; "General Anesthesia Under War Conditions," by W. Harry Archer, Pittsburgh, Pa., associate professor of anesthesia, University of Pittsburgh, and "Traumatic Surgery of the Jaws: The Treatment of Fractures," by Kurt Thoma, Boston, Mass.

Those who attended the institute were presented with certificates of attendance.

A publication of the proceedings is planned, to be made available to all members of the dental profession. It is the wish of the Chicago Dental Society, according to Edward J. Ryan, chairman of the Institute of War Medicine and Surgery for Dentists, to widen and extend the influence of the institute so that every dentist in the nation may profit,

and it is believed that there is no better way to do this than to publish all the papers in a single volume.

At present, the details of publication are not complete, nor has the exact cost been determined, but dentists who are interested in securing a copy of the proceedings should write at once to the Chicago Dental Society, 30 North Michigan Avenue, Chicago, Ill.

CHICAGO MIDWINTER MEETING

The seventy-ninth annual Chicago Dental Society Midwinter Meeting will be held February 22 to 25, at the Palmer House in Chicago.

There was some doubt about holding the meeting at the time of the cancellation of the Boston meeting of the American Dental Association. The very fact that the national meeting had been cancelled made it imperative that constituent societies meet the need for an interchange of dental knowledge and technical developments, particularly as they relate to the war. The wisdom of this conclusion was confirmed by the American Dental Association House of Delegates in St. Louis last August when it unanimously adopted a resolution declaring:

> Inasmuch as the promotion of scientific knowledge is an important function of dental societies, every effort should be made by state and/or local societies to continue scientific meetings so far as possible.

Dr. Bray, president of the Chicago Dental Society, in a letter sent to all dentists who had attended previous Midwinter Meetings, explained that "although we had already gone far ahead in shaping the meeting along the lines of an enlarged and improved scientific program, sale of commercial exhibit space declined below previous levels owing to war conditions, so that our plans were imperiled."

The two alternatives presented to the organization committee were (1) to abandon the plans for improvement of the meeting and even to reduce the number and diversity of lectures, clinics, exhibits, etc., or (2) to secure revenue from an entirely new source.

The overwhelming majority of members of the society insisted that alternative 2 be determined upon and the source be in the nature of a registration fee for out-of-town dentists for whom the Chicago meeting has long been of substantial benefit.

This plan was not entirely acceptable because the society has never made a registration charge of any kind, and did not wish to do so now, since this would imply a distinction between the Chicago dentist and the out-of-town guest.

The answer, Dr. Bray stated, was to invite the guest to become a member of the family by joining the Chicago Dental Society as an associate member for annual dues of $3. In this way, not only is the new revenue essential to a meeting of traditionally high standards secured, but it becomes possible to share other benefits, such as a regular subscription to the official publication, *The Fortnightly Review*, a membership card and a certificate suitable for framing, and use of the facilities of the society offices.

In accordance with the decision, only dentists who are members of the Chicago Dental Society, regular or associate, will qualify for registration at the meeting. Therefore, non-Chicago dentists planning to attend the meeting are urged to apply now for an associate membership application blank to the Chicago Dental Society, 30 North Michigan Ave., Chicago. Membership in the American Dental Association or a recognized foreign dental society is the sole qualification for associate membership in the Chicago Dental Society.

SUPPORT THE DENTAL SCRAP SALVAGE CAMPAIGN!

THE New York committee serving in the scrap salvage campaign has joined a city-wide group which was formed by the First District Dental Society, the Second District Dental Society, the New York Academy of Dentistry, the Allied Dental Council, the Associated Dental Laboratories, the New York State Dental Technicians Guild, local representatives of dental trade and manufacturers' organizations, dental assistants and related groups.

This coordinating committee has divided its function into two major parts: 1. The accumulation of dental scrap materials as listed below. 2. The study of methods for the conservation of dental apparatus, materials and supplies, also the reclaiming of them for further service and reuse and the listing of substitutes for essential apparatus, materials and supplies that cannot be readily obtained, if at all.

The committee wishes all dentists, technicians, dental assistants and related groups to communicate to the chairman written descriptions, with diagrams, if possible, of all tricks and methods of conservation, reclamation and substitution of dental apparatus, materials and supplies.

The scrap should be segregated in individual containers classified as to type of scrap: (1) metals; (2) rubber; (3) plastics. Dental laboratory messengers will make collections on regular pickup and delivery calls. On being brought to the individual laboratories, the scrap will be transferred to a central depot, which will consign it to regular scrap collection agencies.

Those employing technicians privately should drop a line to the chairman, who will arrange to pick up available scrap.

In the case of heavy pieces, such as steel cabinets, chairs, brackets, motors, bench frames, drums and barrels, it is best to arrange with the superintendent of the building for removal. If this is not possible, a line to the chairman will be sufficient.

The materials to be thus segregated and accumulated are:

1. Iron and steel: burs, drills, containers, unusable instruments, fixtures, supplies, etc.

2. Other metals: copper, zinc, lead, tin, mercury, amalgam, brass, aluminum, fusible metals, german silver.

3. Rubber: vulcanite, rubber dam, rubber bands, rubber aprons, old rubber treads, rubber tubing, syringe bulbs, carpule stoppers, polishing cups, etc.

4. Acrylics: old dentures, plastic tops, vessels, etc.

5. Waxes: paraffin, beeswax, black carding wax, etc.

SAVE SCRAP—FOR VICTORY!

LOUIS I. ABELSON, *Chairman.*
New York Sub-Committee on Salvage, Conservation, Reclamation and Substitution
200 West 59th St.,
New York, N. Y.

OBITUARIES

OATHER A. KELLY, D.D.S.

1895-1942

OATHER ALLEN KELLY died suddenly, Friday, September 11, in his office in St. Louis, Mo. He was 47 and had been in good health since a previous coronary attack four years ago. He was born in Hazel Dell, Ill., received his academic education at the University of Missouri and graduated in dentistry at St. Louis University. He served as a first lieutenant in the Dental Corps in the last World War. He was president of the St. Louis Dental Society in 1937, Vice-President of the American Dental Association in 1939 and president of the Missouri State Dental Association in 1941. At the time of his death, he was vice president of the American Society of Exodontists and Oral Surgeons. He was a Fellow of the American College of Dentists and member of Sigma Nu, of Delta Sigma Delta and of Omicron Kappa Upsilon. He is survived by his wife, Mrs. Beula Kelly, three sons, O. A. Kelly, Jr., James and Charles, and three sisters.

Dentistry has suffered no greater loss in recent years than in his passing, and our loss is all the more emphasized by the dignity with which Dr. Kelly graced his chosen specialty. The complete confidence which his colleagues reposed in him bespeaks the respect in which he was held. Certainly his greatest characteristic was his complete moral and intellectual honesty. He had no need for the little shams and pretenses with which most of us try to hide our weaknesses and he stripped them from other people with a cheerful audacity, his candor always kindly and without malice.

Above all else, Oather Kelly loved life. He reveled in his work and in his associations with his colleagues and with his friends. Thoroughly cognizant of the sword which dangled a constant threat above his head, and even as the thread became frayed, he was undaunted. Where smaller souls would have lived in dread and grudgingly hoarded their energies, Dr. Kelly gave grandly and gloriously of himself as if the source were inexhaustible. No call on his time or energies, whether from patient or from friend,

OATHER A. KELLY, D.D.S.
1895-1942

went unheeded or was brushed aside. His love of people and his love of life was reflected in the host of us who were proud to call him friend and he left his chosen place in life a better place than he had found it.

It was a privilege to have known him, for wherever dentists gathered, Dr. Kelly was known and loved, and the honor and

respect which was his locally was multiplied manifold in the honors bestowed on him by his associates from one end of the country to the other. Our sympathy is with his family, who feel the loss most keenly, but we trust that their sorrow may be somewhat tempered by the knowledge that it is shared by so many of us.

JOHN S. VOYLES.

HERBERT ANTHONY POTTS, D.D.S., M.D.

1873-1942

HERBERT ANTHONY POTTS died at his home in Evanston, Ill., Wednesday, October 7, and the long and notable career of one of dentistry's most able oral surgeons ended.

Dr. Potts was born in Green County, Illinois, February 15, 1873, and it was in this community that he received his education and training. Soon after his graduation from the high school at White Hall, Ill., he entered Northwestern University Dental School, where he received the D.D.S. degree in 1895. After practicing dentistry in Bloomington, Ill., for four years, he returned to Chicago and entered Northwestern University Medical School. He received the M.D. degree in 1901. He then served two years as an intern in Mercy Hospital, in Chicago, where his determination to become a surgeon was strengthened by the influence of John B. Murphy. His ability as a surgeon soon brought him an appointment with the Central Illinois Hospital for the Insane.

Early in his career, he perfected his technic for spinal anesthesia, and on his return to Chicago after several years' study in the hospitals of Vienna and Bonn, he introduced the Guido Fischer technic and equipment for mandibular anesthesia with procaine.

In 1908, Dr. Potts began teaching in Northwestern University Dental School, in the departments of pathology and oral surgery. Here, he was closely associated with Thomas L. Gilmer. His ability as a surgeon and his broad knowledge of pathology and of anesthesia were quickly recognized by Dr. Gilmer, and their many years of service together were mutually beneficial. Dr. Potts was made professor of oral surgery in 1920 and was retired as emeritus professor in 1939.

During the World War, Dr. Potts was a major in the Medical Corps, serving with distinction in France as a consultant in a group of several hospitals, giving special attention to maxillofacial surgery. Upon his return from France, he organized the oral surgery department of Cook County Hospital, where he served as chief oral surgeon for fourteen years. Also, for many years, he served as oral surgeon on the staff of St. Luke's Hospital, in Chicago.

Nelidoff photo.

HERBERT ANTHONY POTTS,
D.D.S., M.D.
1873-1942

Modesty was an outstanding characteristic of Dr. Potts. During the many years of close friendship that I was privileged to enjoy with him, I never heard

him draw attention to his knowledge, skill or ability. He did not need to do that to impress his professional confrères or his patients. His quiet, gentle, yet firm manner, the confidence with which he went about the task at hand, the look in his eye, were sufficient to carry conviction that he knew exactly what to do and how to do it.

Dr. Potts' broad experience and continuous study brought to him knowledge far outside his special field. This fact was recognized by his friends in both the medical and the dental profession and they made frequent use of their opportunities to seek that advice which he always gave generously and freely.

Dr. Potts was a great lover of nature. The out-of-doors was his realm. He was not one to become eloquent about the world and its wonders; rather, he looked and breathed and drank it in with the quiet enjoyment that was characteristic of him. His chief sport, and one in which he took great delight, was hunting—ducks, geese or pheasants. And yet it was difficult to know in which he took the greater delight, in hunting or in serving the game to his friends at a quiet family dinner.

Dr. Potts was a great oral surgeon and educator; but he was more than that: he was a *man*—kindly, sweet, patient, gentle, firm—the kind of man it is a privilege to have known and loved. His quiet strength marked him a character worthy of emulation.

Dr. Potts was a member of many professional and scientific societies, including the American Medical Association, the American Dental Association, the American College of Surgeons and the Institute of Medicine, Chicago.

His widow, Anne Schriel Potts, and two children, William and Suzanne, survive.

ROBERT E. BLACKWELL.

DEATHS

ANGLE, FRED C., Belvidere, Ill.; Chicago College of Dental Surgery, 1898; died October 5; aged 71.

BARCLAY, JAMES A., Macomb, Ill.; Chicago College of Dental Surgery, 1908; died September 24; aged 61.

BEARD, WILLIAM THOMAS, San Antonio, Texas; Atlanta Dental College, 1908; died September 14; aged 57.

BREHM, A. O., Bloomington, Ill.; Chicago College of Dental Surgery, 1918; died August 1; aged 56.

BRYANT, ELWYN R., New Haven, Conn.; Philadelphia Dental College, 1902; died October 2; aged 66.

CHASE, HERBERT H., La Crosse, Wis.; Northwestern University Dental School, 1896; died September 5; aged 68.

CLARK, C. HOWARD, Pitman, N. J.; Pennsylvania College of Dental Surgery, 1903; died May 8.

CRAIGHEAD, DONALD C., Philadelphia, Pa.; Temple University Dental School, 1903; died recently.

CRUMBAUGH, VERNON B., Akron, Ohio; Ohio College of Dental Surgery, 1899; died August 22; aged 69.

CUNNINGHAM, GEORGE W., LeMars, Iowa; Chicago College of Dental Surgery, 1898; died August 6; aged 71.

DENNIS, THEODORE L., St. Petersburg, Fla.; formerly of Chicago, Ill.; Chicago College of Dental Surgery, 1922; died October 6.

DEVEREAUX, CHARLES C., Janesville, Wis.; Chicago College of Dental Surgery, 1896; died June 14; aged 74.

DORLAND, ANSON B., Grand Rapids, Mich.; Philadelphia Dental College, 1894; died August 10; aged 72.

DUNCAN, ALVIN LEE, Seattle, Wash.; State University of Iowa College of Dentistry, 1904; died July 18; aged 61.

INCIDENTS OF PRACTICE

Anodontia of the Deciduous Dentition

By E. L. Miller,* M.D., Jena, La.

My work requires the examination of children, and I have made in excess of 10,000 such examinations. Having had one year in dentistry as a prelude to the study of medicine, I have an unusual interest in dentition. Of the unusual conditions that I have found, the outstanding case is that of a colored child at Jonesville, La. It has required several months for me to verify the birth date of this child, but I have finally done so. She was born January 1, 1934. I examined her early in February 1942. At that time, all of the deciduous teeth were absent and had been replaced by normal permanent teeth. In addition, she had the first permanent molars and all second permanent molars, twenty-eight perfect, normal teeth. And she was but a few weeks over 8 years of age.

This may not be unusual in the annals of dental history, yet to me it is odd enough to justify this report.

A Migrating Impacted Tooth

By William Stanley Carrick, D.D.S., Asbury, N. J.

A girl, aged 16, complained of severe pains in the bicuspid area of the lower left side of the mandible.

Clinically, examination disclosed no deformity. The mucosa was normal. All of the teeth in the left mandible were absent, from the lower left cuspid to the second molar inclusive.

A roentgenogram (Fig. 1) disclosed bicuspid tooth lying horizontally in the body of the mandible with the crown facing distally and encased in a cystic sack. A small portion of the apex appeared to be incomplete.

The patient was referred to me for removal of the impacted tooth, but the pain

Fig. 1.—Migrating impacted tooth (September 1939). (X-ray examination by E. B. Stillwell.)

Fig. 2.—Tooth shown in Figure 1 (September 1941). (X-ray examination by R. E. Rankin.)

subsided and nothing further was done concerning its removal.

In September 1941, a slight discomfort caused the patient to consult her dentist. Clinically, no objective symptoms were noted except that the second molar was at a 45° angle lingually.

A roentgenogram disclosed the fact that

*Director of the Catahoula-LaSalle Bi-Parish Health Unit.

the impacted tooth had migrated more than its entire length through the body of the mandible. It is to be noted that the passage was distally and the tooth appeared to be passing the second molar buccally.

The patient was referred to me for the removal of this tooth, and the usual technic of exposing the area with a flap and removing osseous tissue, exposing crown and cyst, was employed. (Fig. 3.) Upon removal of the tooth, it was noted that a large portion of the molar roots on the buccal plane had been resorbed through pressure. This tooth was also removed. Recovery was uneventful.

COMMENT

It is not the purpose here to describe the position of the tooth or the technic employed in its removal, as neither is unusual in the practice of an exodontist. Rather, I wish to record the puzzling

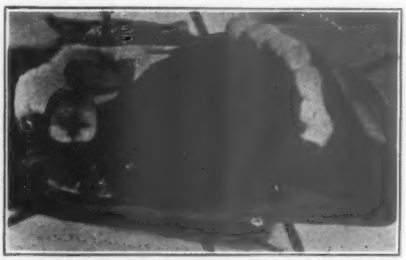


Fig. 3.—Reproduction of model showing migrating impacted tooth ready to be elevated from body of mandible, and showing angle of molar lingually.

movement of this tooth and to speculate upon the force that had not only driven this tooth distally along the body of the mandible, but also still had pressure sufficient to force the second molar so that it was at a 45° angle lingually.

It is noted that an overwhelming majority of impacted teeth move in an anterior direction. For example, teeth impacted in the palate or the mandible have crowns facing mesially, while this particular tooth not only moved its entire length, but in a distal direction.

An exhaustive search of dental literature failed to throw any light upon this phenomenon.

Any comments or description of smiilar cases encountered by the profession would be appreciated.

Asbury Park Trust Building.

Supernumerary Tooth

By MARTIN T. SIEGEL, D.D.S., Poughkeepsie, N. Y.

A child aged 6 years who had a supernumerary tooth between the maxillary first incisors was found, on x-ray examination, to have both right and left maxillary permanent second incisors. Extraction of the supernumerary tooth was indicated because of the

Supernumerary tooth between first incisors.

presence of the normal permanent teeth and because the child was so young that it was believed that a normal closure of space would take place.

27 Cannon Street.

Replacement of Broken Bridge Pontic

By GEORGE L. REICHENSTEIN, D.D.S., New York, N. Y.

Every dental practitioner is familiar with the distress that arises in the case of replacement of a broken tube tooth, especially on a fixed bridge. Rarely, in spite of the best efforts by the indirect or even direct method of grinding a porcelain tube tooth to fit, can poor margins be avoided.

Faulty results are even more to be expected if the manufacturer of the broken

tooth cannot be determined or if it is of foreign make, so that it is impossible to procure supplies from a standard stock.

The ever-increasing use of acrylics gave birth to the idea of handling this kind of emergency as one would a direct inlay. A wax pattern is easily made after the removal of porcelain chips and cement remnants, and an inlay is made in acrylic. The correct shade is selected and the wax pattern flasked, cured, polished and cemented as an acrylic inlay.

730 Fifth Avenue.

An Inverted Third Molar

By J. A. WELLS, D.D.S., Shawnee, Okla.

Herewith is a roentgenogram of an inverted mandibular third molar. The patient was being treated for neuritis,

Inverted third molar.

but the symptoms were definitely those of neuralgia. The x-ray evidence indicated that the tooth was causing pressure. When the tooth was removed, the condition cleared up at once.

QUESTIONS AND ANSWERS

The answers here published have been prepared by authorities, but do not represent the opinion of the American Dental Association as an organization or of any other official bodies unless specifically stated in the reply.

THUMB-SUCKING

To the Editor: What are the most effective methods for preventing a 3-year old child from sucking his thumb? Thank you for a prompt reply.

R. I. D., Boston, Mass.

ANSWER

The following measures are suggested:

1. A good sound spanking. Nothing has so lasting effect on a young child as pain. It has been stated by an authority that if an infant a few days old who sucked his thumb had his thumb pricked with a needle, he would discontinue the habit immediately. When coaxing, bribes and threats fail, a genuine spanking, together with a firm attitude of the parents, will usually get results.

2. There are a number of suitable liquid preparations with an unpleasant taste which may be applied to the thumb. These are effective in many cases.

3. A number of mechanical devices made to be worn by the patient will prevent the placing of the thumb in the mouth. The simplest of these is a long cuff, made of pasteboard or other material, which will enclose the elbow and enough of the arm to prevent the placing of the thumb in the mouth. Such an article would be worn principally at night.

4. If none of the plans mentioned above seem desirable or if they do get results, the following procedure may be followed to make an appliance to be placed in the mouth: Make and fit seamless gold crowns for the upper deciduous cuspids, take an impression and pour in investment. Solder a wire (0.040) to the lingual surface of one crown and have it extend across the palate and fit into a tube soldered to the lingual surface of the other crown. This, when cemented in place, will prevent any satisfaction from attempts at sucking the thumb. In some cases, it is advisable to solder a few short wire spurs to the cross wire and tube for additional inconvenience to the patient.

C. R. B.

CURRENT LITERATURE

Journal of Dental Research
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*Relative Alveoloclastic Experience of the Various Teeth. Samuel Charles Miller and Benjamin B. Seidler.—365.

*The Incidence of B. Fusiformis and Spirochetes in the Edentulous Mouth. S. Leonard Rosenthal and Edward H. Gootzeit.—373.

*Comparative Infectivity for Guinea-Pigs of Fusospirochetal Exudates from Different Diseases. Genevieve Foley and Theodor Rosebury.—375.

*Effect of Drying on Bacterial Counts of Oral Mucous Membranes. Carl August Schlack, Charles Davidson Hemphill and Donald R. Taylor.—379.

*Potential Acidity and Impermeability of Spontaneously Precipitated Salivary Mucin. J. T. Gore.—383.

*Masticatory Stresses and Their Relation to Dental Caries. Meyer Klatsky.—387.

*Rôle of the Dental Papilla in Early Tooth Formation. Part I. Roentgenographic Study. Harry H. Shapiro, William Lefkowitz and Charles F. Bodecker.—391.

*Tooth Eruption: Axial Movement of Teeth with Limited Growth. Harry Sicher.—395.

The Epithelial Sheath: Histogenesis and Function. Moses Diamond and Edmund Applebaum.—403.

*Dental Studies of Triplets. II. Arch Form and Pattern. J. T. Cohen, C. P. Oliver and S. Bernick.—413.

International Association for Dental Research. Scientific Proceedings of the New York Section, May 18, 1942. Compiled by Frances Krasnow, section editor.—421.

Relative Alveoloclastic Experience of the Various Teeth

ROENTGENOGRAMS of 500 patients selected at random from the periodontia clinic were employed for the study. Each erupted tooth was given an alveoloclasia number ranging from 0 to 5, depending on the relative amount of bone loss evidenced. Males appeared to show a greater susceptibility to alveoloclasia. The various teeth were compared by forming three broad categories of relative susceptibility to alveoloclasia. The group having greatest resistance to this condition was found to include the maxillary and mandibular canines and first and second premolars and the mandibular third molars. The group of moderately susceptible contained the mandibular first and second molars. The category of greatest susceptibility contained the mandibular and maxillary first and second incisors as well as the maxillary first, second and third molars. The mean combined alveoloclasia indices of the teeth in each of the three categories were plotted against age. Since the three groups follow separate paths throughout the age ranges studied (10 to 70 years), it may be inferred that the relative susceptibility of the various individual teeth is similarly different throughout life.

Incidence of B. Fusiformis and Spirochetes in the Edentulous Mouth

CONTRARY to accepted statements, oral spirochetes and fusiform bacilli are found on the mucosa of edentulous patients. Examination of 200 healthy adults revealed small numbers of these organisms on the normal mucosa, although none were found on dentures or in traumatic areas under dentures. There is a marked decrease in the number of all types of organisms.

Comparative Infectivity for Guinea-Pigs of Fusospirochetal Exudates from Different Diseases

SUSPENSIONS of gingival scrapings from sixty-four of 105 clinic patients were injected subcutaneously into the groins of guinea-pigs after dark-field examination for fusospirochetal flora. These included patients with acute Vincent's infection, periodontosis, marginal gingivitis and third molar flap infections. Positive responses in the animals

*Titles marked with an asterisk are abstracted herewith.

were indicated by development, usually within ten days, of a necrotic abscess or cellulitis, with aspirable foul exudate containing the fusospirochetal flora. Such responses, without gross differences that could be correlated with the source of infection, were obtained in forty instances (63 per cent) and with the suspensions from all four oral diseases. No significant differences were found in the frequency of infectivity of suspensions from the four diseases. Similar results were obtained with pus taken by bronchoscope in cases of lung abscess and with suspensions of gingival scrapings from the mouths of these patients, all of whom had gingival or periodontal disease. These results indicate that fusospirochetal exudates from different human sources, irrespective of the clinical differences in the source disease, are all approximately equally pathogenic for guinea-pigs by the method of inoculation employed.

Effect of Drying on Bacterial Counts of Oral Mucous Membranes

ORAL areas chosen for this study were (1) the mucosa above the gingival portion of the external alveolar plate between the maxillary canines (fifty patients) and (2) the mucosa at the site of injection for the mandibular nerve near the mandibular foramen (twenty patients). The air blast only was used for drying these membranes.

Colony counts from the wet maxillary areas ranged between 4,288 and 105, with 80 per cent approximating the 4,288 count and 20 per cent approximating the 105 count. In dried areas, the counts ranged between 1,152 and 0, with 20 per cent approximating the 1,152 count and 80 per cent falling between 400 and 0. The average wet count was 2,599, the dry, 339.

Mandibular colony counts dried ranged between 23 and 2,304, with an average of 811. Wet, they ranged between 640 and 5,568, with an average of 2,357.

Potential Acidity and Impermeability of Spontaneously Precipitated Salivary Mucin

EQUAL portions of a 50-cc. specimen of the author's partially stimulated saliva, to which bromcresol purple was added, were placed in two conical centrifuge tubes and incubated for twenty-four hours. Thymol crystals, which have no effect on amylolytic enzymes, were fused to the sides of one of the tubes to prevent fermentation.

The mucin was spontaneously precipitated in both tubes in about two hours. The supernatant liquid in both tubes and the precipitate in the thymol-treated saliva remained purple throughout the experiment. The precipitate in the untreated saliva-bromcresol purple solution gradually turned yellow, reaching its maximum color depth in about eight hours after being placed in the incubator, indicating a pH of approximately 5.4, the yellow persisting for about sixteen hours. The pH of the supernatant liquid remained near the neutral point. Separation of the incubated supernatant liquid and precipitate was only partially successful, but tests with the glass electrode showed the supernatant liquid to be pH 7.02 and the precipitate pH 6.42, the fresh whole saliva having a pH of 7.20.

Masticatory Stresses and Their Relation to Dental Caries

MASTICATORY stresses of 100 males and 100 females were measured by means of the gnathodynamometer. In the male group, the highest masticatory pressure recorded was 210 pounds, and the lowest 55 pounds. Average for the 100 males was 112.86 pounds on the left side and 119.58 on the right. For females, the highest was 165 pounds and the lowest 25 pounds, an average of 83.91 pounds on the left and 85.75 on the right side. Each individual studied was also examined for caries. The caries index ranged from 0 to 50 in the male group (average 18.96); in the female, 0 to 51 (average 23.82). A comparison of the male and female records shows that the biting stress of the average male is much greater than that of the average female, and the caries index of the average male was much lower than that of the female group. A similar inverse ratio between the amount of biting stress and the dental caries index seems to exist also when comparisons are made within the sex groups. This leads to the conclusion that the state of development of the masticatory apparatus is a determining factor in the incidence of dental caries.

The Rôle of the Dental Papilla in Early Tooth Formation: Part I. Roentgenographic Study

IN order to study the influence of the developing dental papilla upon the differentiation of the other tooth components, the intact papilla in the teeth of young cats was removed through the apical region. The remaining portions of the developing tooth and its surroundings were observed for varying lengths of time by means of roentgenograms. Under ether anesthesia, an incision was made on one side through the soft tissues overlying the border of the mandible and a window cut through the cortical bone with a surgical bur. The intact dental papilla, including the odontoblastic layer, was removed from the canine tooth on one side, and the wound sutured. The mandibular canine of the opposite side served as the control in each case. Roentgenographic examination of two animals offers some evidence that absence of the dental papilla results in alteration of the eruption of the tooth, changes in calcification, and formation of new bone. A further report on the histologic findings in these and additional animals is in progress.

Tooth Eruption: Axial Movement of Teeth with Limited Growth

IT could be shown that root growth and bone growth are the two factors in the axial movement of erupting human teeth. More specifically, it is the growth of the pulp in a restricted proliferation zone at the apical end of the tooth above the inflected epithelial sheath and the proliferation of the osteogenic tissue preceding bone apposition that combine to supply the "force" of eruption.

The root ends of single-rooted teeth rest upon cushioned hammock ligaments anchored in bone and periodontal membrane. This consists of a network of strong fibers and large amounts of fluid contained in round spaces between the fibers. It supports the growing root end and directs its growth, which becomes the one component of axial movement. It acts at the same time as an equalizer for the "pressure" exerted by the growing bone at the alveolar fundus. The bone grows by the formation of concentric bone trabeculae. The formation of a new trabecula is initiated by irregular proliferation of short bony sprouts from the surface of the old bone trabecula. The cushioned hammock ligament correlates root (pulpal) growth and bone (osteogenic tissue) growth in one coordinated "force" of eruption.

The amount of bone formed behind the moving tooth is different in different teeth and is proportional to the distance a tooth travels during Weinmann's second phase of eruption.

After establishment of the bifurcation and during the later development of the roots, in multirooted teeth, bone grows only at the crest of the interradicular septum. Thus, the tooth is lifted upward in its alveolus, and the root grows simultaneously into the periapical area. In such teeth, not one of the complicated structures that correlate bone and root growth in single-rooted teeth can be seen.

After the root is fully developed, bone apposition at the alveolar fundus is the "force" of eruption.

Dental Studies of Triplets. II. Arch Form and Pattern

TRACINGS to show the patterns of the dental arches were drawn for the members of nine sets of triplets and three sets of nonrelated persons. Five of the triplet sets had each one pair of identical twins, and only two of the five pairs of identical twins showed identical patterns. The arches of the identical pairs in the other three sets were relatively similar in general shape and size, but they varied in pattern. However, for the most part, they had arch patterns that were more alike than the patterns of the fraternal twins and non-related persons. Regarding the extrinsic factors in the development of temporary or permanent differences between the arches of twins it is concluded that, of the two methods of study, the use of arch patterns will be more reliable in the determination of monovular origin.

Relationship of Blood Plasma Vitamin C Level to Gingival and Periodontal Disease

By D. Y. BURRILL

THIRTEEN hundred ninety-six patients were examined over a period of two years for periodontal and gingival conditions. The

blood plasma vitamin C level of each patient was determined by the micromethod of Farmer and Abt on the same day that the oral examinations were made. The vitamin C levels ranged from 0.04 to 2.16 mg. per hundred cubic centimeters. It was noted that the blood levels tended to be lower in cases of gingivitis. The seasonal variation in vitamin C plasma content and the incidence of gingivitis were such that no casual relationship between low vitamin C and the presence of gingivitis was apparent. The cases with periodontal disease also tended to show lower vitamin C levels than those free from the disease. The differences between the groups were very small and were probably not significant. It was suggested that since a person who neglects his mouth is very likely to neglect his diet, gingivitis and periodontal disease may arise from the same neglect that allows the vitamin C level to become low.—*J. D. Res.*, 21:353, August 1942.

CHARLIE AMMONS.

Diagnosis and Pathology of Anachoretic Pulpitis, Dental Granulomas and Cystic Lesions

By HAMILTON B. G. ROBINSON

ORAL pathology is the keystone of dental practice and should be available and applied in daily practice. The value of thorough understanding of oral pathology can be exemplified by considering the diagnosis of a few lesions. Anachoretic pulpitis has been produced experimentally and probably explains the occurrence of pulpitis in some teeth following operative procedures. Its diagnosis is made by careful evaluation of the case history. Dental granulomas produce fairly typical roentgenographic shadows, which are due to their structure. They are potentially dental root cysts and their differentiation from cysts is often impossible by roentgenographic evidence alone. Cysts of the tooth-bearing bone may be conveniently classed as dentoperiosteal (dental root and paradental), dentigerous and follicular. They are differentiated on the bases of their clinical roentgeographic and histologic appearance. Other lesions, such as the ameloblastoma and generalized osteitis fibrosa, may resemble the cysts roentgenographically and clinically. The utilization of all diagnostic aids is essential to the intelligent practice of dentistry.—*Illinois D. J.*, 11:431, October 1942.

HAMILTON B. G. ROBINSON.

Cutaneous Fistulas of Dental Origin

By R. C. WENDE and H. A. SOLOMON

CUTANEOUS fistulas associated with the teeth represent draining alveolar abscesses. This type of abscess is usually associated with non-vital teeth, retained roots and "residual infection" following extraction of diseased teeth. Recent reports are cited which indicate that such a fistula may be mistaken for an epidermoid carcinoma. Both intra-oral and extra-oral roentgenograms are of value in making the diagnosis, although the former show more detail of the teeth and associated structures than the latter. Injection of radiopaque solutions and explanatory introduction of probes into suspicious lesions are also valuable diagnostic aids. Resort to biopsy, except in questionable cases, is unnecessary. Treatment of such a lesion should consist of extraction of the offending tooth and curettement of the alveolus and contiguous infected granulation tissue and the abscess. A series of eleven cases are described in some detail.—*Arch. Derm. & Syph.*, 46:665, November 1942.

J. E. GILDA.

Ulceromembranous Stomatitis: Three Atypical Cases

OF ninety cases of ulceromembranous stomatitis, eighty-seven were classified on clinical and bacteriologic grounds as Vincent's infection, but three differed materially from the others. In all three, toxemia and prostration were severe, a purulent conjunctivitis was present and fetor oris was absent. None responded to sulfanilamide therapy, but all improved with blood transfusion. In two cases, hemolytic streptococci were isolated from the mouth lesions, but this is not suggested as the sole bacterial cause. These cases also showed marked skin eruptions. In the third case, a non-hemolytic streptococcus was isolated and skin reactions did not appear. It is suggested that a neurotropic virus might be an additional causative agent.—*Brit. Med. J.*, 2:273, September 5, 1942.

B. G. BIBBY.

ANNOUNCEMENTS

ANNOUNCEMENTS must be received by the fifth day of the month in order to be published in the forthcoming issue of THE JOURNAL.

CALENDAR OF MEETINGS

AMERICAN ACADEMY FOR PLASTICS RESEARCH IN DENTISTRY, Chicago, Ill., February 21, 1943.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (DENTAL SUBSECTION), New York, December 28.

AMERICAN ASSOCIATION OF ORTHODONTISTS, Chicago, May 3-6, 1943.

CHICAGO DENTAL SOCIETY, February 22-25, 1943.

DALLAS COUNTY (TEXAS) DENTAL SOCIETY MIDWINTER CLINIC, Dallas, January 25-27, 1943.

DENTAL PROTECTIVE ASSOCIATION, Chicago, Ill., December 21.

DISTRICT OF COLUMBIA DENTAL SOCIETY, second and fourth Tuesdays in each month, from October to June at the United States Public Health Service Auditorium, Washington.

GREATER NEW YORK DENTAL MEETING, New York, December 7-11.

NATIONAL BOARD OF DENTAL EXAMINERS, January 25-26, 1943.

PAN AMERICAN ODONTOLOGICAL ASSOCIATION, New York, December 9.

GREATER PHILADELPHIA ANNUAL MEETING, February 3-5, 1943.

WOMEN'S DENTAL SOCIETY OF NEW YORK, New York City, December 16.

STATE SOCIETIES

February

Minnesota, at St. Paul (17-19)

May

Tennessee, at Nashville (10-13)

STATE BOARDS OF DENTAL EXAMINERS

Alabama, at Birmingham, March 15, 1943. W. A. Wood, Merchants National Bank Bldg., Mobile, Secretary.

California, at San Francisco, February 15 and April 19, and at Los Angeles, March 22. Kenneth I. Nesbitt, 515 Van Ness Ave., San Francisco, Secretary.

Florida, at Jacksonville, March 15-18, 1943. H. B. Pattishall, 351 St. James Bldg., Jacksonville, Secretary.

Indiana, at Indianapolis, December 14-19. D. Gordon Lamb, 819 Chamber of Commerce Bldg., Indianapolis, Secretary.

Kentucky, at Louisville, March 9-12, 1943. W. F. Walz, 1114 First National Bank Bldg., Lexington, Acting Secretary.

Minnesota, at Minneapolis, December 14-19. G. R. Metcalf, Barnesville, Secretary.

New Jersey, April 4-9. Walter A. Wilson, 150 E. State St., Trenton, Secretary.

North Carolina, at Raleigh, April 5, 1943. Wilbert Jackson, Rich Building, Clinton, Secretary.

Pennsylvania, at Pittsburgh and Philadelphia, February 16-20, 1943. Reuben E. V. Miller, 61 N. Third St., Easton, Secretary.

Texas, at Dallas, December 7-10. Carl C. Hardin, 520 Littlefield Bldg., Austin, Secretary.

Virginia, at Richmond, March 30. John M. Hughes, 715 Medical Arts Bldg., Richmond, Secretary.

Wisconsin, at Milwaukee, February 8-12, 1943. S. F. Donovan, Tomah, Secretary.

AMERICAN ACADEMY FOR PLASTICS RESEARCH IN DENTISTRY

THE meeting of the American Academy for Plastics Research in Dentistry will be held in the Palmer House, Chicago, February 21, 1943. Application for admission to the scientific session should be made to the secretary.

LAMAR W. HARRIS, *Secretary,*
25 E. Washington St.,
Chicago, Ill.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE Dental Subsection of the American Association for the Advancement of Science will meet in New York December 28. The committee in charge of the meeting is composed of Arthur H. Merritt, William J. Gies and Paul C. Kitchin. There will be a symposium on "Dental Aspects of the Focal Infection Theory." Dentists and physicians are welcome.

PAUL C. KITCHIN, *Secretary,*
College of Dentistry,
Ohio State University,
Columbus.

AMERICAN ASSOCIATION OF ORTHODONTISTS

THE next meeting of the American Association of Orthodontists will be held at the Edgewater Beach Hotel, Chicago, May 3-6, 1943.

MAX E. ERNST, *Secretary,*
St. Paul, Minn.

CHICAGO DENTAL SOCIETY MIDWINTER MEETING

THE 1943 Midwinter Meeting of the Chicago Dental Society will be held at the Palmer House, February 22-25.

HAROLD W. OPPICE, *Secretary.*

DALLAS COUNTY DENTAL SOCIETY MIDWINTER CLINIC

THE sixteenth annual midwinter dental clinic sponsored by the Dallas County (Texas) Dental Society will be held at the Hotel Adolphus, Dallas, January 25-27, 1943. Three nationally known clinicians will be presented in a three-day study course. The fee of $15 includes the banquet and table clinics, January 26. Members of the American Dental Association are invited.

PHELPS J. MURPHEY, *Chairman,*
Publicity Committee,
Fairmount at Welborn,
Dallas.

DENTAL PROTECTIVE ASSOCIATION

THE annual meeting of the Dental Protective Association of the United States will be held at the Palmer House, Chicago, December 21 at 5 p.m. The report of the officers will be given. A board of directors will be elected, and such other business will be transacted as should come before the association. All members are urged to be present.

By order of the Board of Directors.
E. W. ELLIOTT, *Secretary.*

GREATER NEW YORK DENTAL MEETING

THE next Greater New York Dental Meeting will be held in the Hotel Pennsylvania, New York, December 7-11.

WALTER A. QUINN, *Chairman,*
Press and Publication.

NATIONAL BOARD OF DENTAL EXAMINERS

THE National Board of Dental Examiners will hold its next session for the examination of candidates in Parts 1 and 2, January 25-26, 1943, in schools where there are five or more candidates. For further information and application blanks, address

GORDON L. TEALL, *Secretary,*
514 Delaware St.,
Hiawatha, Kan.

PAN AMERICAN ODONTOLOGICAL ASSOCIATION

THE next annual dinner meeting of the Pan American Odontological Association will be held in the Hotel Pennsylvania, New York, December 9, at 6 o'clock.

RALPH HOWARD BRODSKY,
Executive Secretary,
14 E. 81st St.,
New York.

GREATER PHILADELPHIA ANNUAL MEETING

THE Greater Philadelphia Annual Meeting will be held February 3-5, 1943, at the Benjamin Franklin Hotel.

ABRAM COHEN, *Chairman,*
Publicity Committee,
269 S. 19th St.,
Philadelphia.

WOMEN'S DENTAL SOCIETY OF NEW YORK

THE Women's Dental Society of New York will hold its midwinter election meeting at the Pennsylvania Hotel, December 16 at 8 p.m. Matters of great importance will be discussed and a large attendance is urged. Refreshments will be served.

GEORGETTE J. HAIGH, *President,*
133 W. 72nd St.,
New York.

MINNESOTA STATE DENTAL ASSOCIATION

THE sixtieth annual meeting of the Minnesota State Dental Association will be held in the Municipal Auditorium, Minneapolis, February 17-19, 1943.

L. M. CRUTTENDEN, *Secretary,*
498 Lowry Bldg.,
St. Paul.

TENNESSEE STATE DENTAL ASSOCIATION

THE officers of the Tennessee State Dental Association will hold its annual meeting in Nashville, May 10-13, 1943, at Hotel Andrew Jackson.

E. JEFF JUSTIS, *Secretary,*
1504 Exchange Bldg.,
Memphis.

BOARD OF DENTAL EXAMINERS OF ALABAMA

THE Board of Dental Examiners of Alabama will conduct its next annual dental examination beginning March 15, 1943, in Birmingham. All credentials must be filed with the secretary at least two weeks in advance of the examination. Address all correspondence to

W. A. WOOD, *Secretary,*
Merchants National Bank Bldg.,
Mobile.

BOARD OF DENTAL EXAMINERS OF CALIFORNIA

THE next examinations to be conducted by the Board of Dental Examiners of California for a license to practice dentistry and for a license to practice dental hygiene in California will be held in San Francisco, commencing on February 15, 1943; in Los Angeles, commencing on March 22, 1943, and again in San Francisco commencing on April 19, 1943. All credentials must be in the office of the Secretary, Room 203, 515 Van Ness Avenue, San Francisco, at least twenty days prior to the date of the examinations. Address all communications to Kenneth I. Nesbitt, Secretary, Room 203, 515 Van Ness Ave., San Francisco.

FLORIDA STATE BOARD OF DENTAL EXAMINERS

THE Florida State Board of Dental Examiners will hold its annual examination of applicants for license to practice dentistry and dental hygiene in Florida at Jacksonville in the Seminole Hotel, March 15-18, 1943. Applicants for a license to practice dentistry must file preliminary applications by January 14, 1943. Final applications for license to practice dentistry or dental hygiene must be complete by February 13. Address all communications to

H. B. PATTISHALL, *Secretary,*
351 St. James Bldg.,
Jacksonville.

INDIANA STATE BOARD OF DENTAL EXAMINERS

THE next examination for licensure of the Indiana State Board of Dental Examiners will be held in Indianapolis beginning December 14 and continuing four days. All applications, fees and credentials must be in the hands of the secretary not later than ten days prior to the examination. For application, instructions and other information address

D. GORDON LAMB, *Secretary,*
819 Chamber of Commerce Bldg.,
Indianapolis.

KENTUCKY STATE BOARD OF DENTAL EXAMINERS

THE next meeting of the Kentucky State Board of Dental Examiners will be held March 9-12, 1943, at the University of Louisville Dental School, Louisville. Dentists who graduated prior to 1943 and who wish to stand examination before this board must file applications, complete with full information requested, at this office not later than January 9. Applications of 1942 graduates must be in the secretary's office by February 9. Dental hygienists who have completed a two-year course and who desire to stand examination before this board must file applications with the board by February 9. Ample time should be allowed for securing all data required. For application forms and further information, apply to

W. F. WALZ, *Acting Secretary,*
1114 First National Bank Bldg.,
Lexington.

MINNESOTA STATE BOARD OF DENTAL EXAMINERS

THE next examination to be given by the Minnesota State Board of Dental Examiners will be held at the College of Dentistry, University of Minnesota, Minneapolis, December 14-19. All examination fees must be in the hands of the secretary at least

ten days before the date of examination. Address all communications to

G. R. METCALF, *Secretary,*
Barnesville.

NEW JERSEY STATE BOARD OF REGISTRATION AND EXAMINATION IN DENTISTRY

THE State Board of Registration and Examination in Dentistry in New Jersey will hold its next examination commencing April 4, 1943 and continuing for five days. Upon application to the secretary, a copy of the requirements and rules, instruction sheet and preliminary application will be sent. Any person desiring to apply as a candidate must file the preliminary application blank, together with the examination fee of $25, on or before February 15.

WALTER A. WILSON, *Secretary,*
150 E. State St.,
Trenton.

NORTH CAROLINA STATE BOARD OF DENTAL EXAMINERS

THE next meeting of the North Carolina State Board of Dental Examiners for the examination of applicants for licensure will be held at the state capitol, Raleigh, beginning April 5, 1943. Applications must be filed with the secretary thirty days before the examination. For application blanks and further information, address

WILBERT JACKSON, *Secretary,*
Rich Building,
Clinton.

DENTAL COUNCIL AND EXAMINING BOARD OF THE COMMONWEALTH OF PENNSYLVANIA

THE Dental Council and Examining Board of the Commonwealth of Pennsylvania will meet in Philadelphia and Pittsburgh, February 16-20, 1943, to examine applicants for license to practice dentistry. Owing to the acceleration of the courses, no examinations will be held at this time for a dental hygiene license. For further information and application blanks, address the Department of Public Instruction, Bureau of Harrisburg.

REUBEN E. MILLER, *Secretary,*
61 N. Third St.,
Easton.

TEXAS STATE BOARD OF DENTAL EXAMINERS

THE Texas State Board of Dental Examiners will hold its next examination December 7-10 in Dallas. Applications must be filed at least ten days prior to the date of examination. For further information, address

CARL C. HARDIN, JR.,
Executive Secretary,
520 Littlefield Bldg.,
Austin.

VIRGINIA STATE BOARD OF DENTAL EXAMINERS

THE next regular meeting of the Virginia State Board of Dental Examiners will be held at the Medical College of Virginia, Richmond, beginning at 9 a.m., March 30, 1943. Each applicant will be required to present a certificate from the Virginia State Board of Education, State Office Building, Richmond, showing that he has had at least one year of academic education equal to one year of college work. He must be a graduate of a Class A dental college and must be prepared to do any kind of practical or operative work necessary to the general practice of dentistry. The theoretical examination covers subjects usually found in a complete dental curriculum. No applications will be accepted after March 20. For application blanks and further information, apply to

JOHN M. HUGHES, *Secretary,*
715 Medical Arts Bldg.,
Richmond.

WISCONSIN STATE BOARD OF DENTAL EXAMINERS

THE Wisconsin State Board of Dental Examiners will hold its next examination, February 8-12, 1943, at Marquette University Dental School, Milwaukee, for the licensure of dentists and dental hygienists. For applications and full particulars, address the secretary. No applications will be accepted after February 2.

S. F. DONOVAN, *Secretary,*
Tomah.

PACIFIC COAST SOCIETY OF ORTHODONTISTS

THE meeting of the Pacific Coast Society of Orthodontists scheduled for February 22-24 has been cancelled.

EARL F. LUSSIER, *Secretary,*
450 Sutter Bldg.,
San Francisco, Calif.

RESIDENCY IN DENTAL MEDICINE

THE University of Oregon Medical School Hospitals and Clinics offer a residency in the Division of Dental Medicine and Oral Surgery. Appointment will be made about December 1. The period of service is one year, from July 1 to June 30; compensation $40 a month in addition to board, room and laundry. The division is under the general direction of the department of medicine. Its service is carried on in several units: (1) the general outpatient clinic; (2) the Multnomah Hospital; (3) the Doernbecher Children's Hospital, and (4) the University State Tuberculosis Hospital. Service is under the direct supervision of the head of the division and a visiting staff of sixteen dentists. Applicants should indicate their previous training and major interest in one or more of the following subjects; (1) research; (2) clinical medicine; (3) exodontia and oral and plastic surgery; (4) radiography, and (5) restorative dentistry. Inquiries should be directed to

RICHARD B. DILLEHUNT, *Dean,*
University of Oregon Medical School,
Portland, Ore.

RESEARCH FELLOWSHIPS IN MEDICINE, DENTISTRY AND PHARMACY, UNIVERSITY OF ILLINOIS, 1943-1944

APPLICATIONS for research fellowships in medicine, dentistry and pharmacy in the University of Illinois are now being considered for the year beginning September 1, 1943. Appointments to these fellowships will be announced January 1, 1943. Candidates for these fellowships must have completed a training of not less than eight years beyond high school. The fellowship carries a stipend of $1,200 per calendar year with one month's vacation. Application blanks and further information can be secured from the secretary of the Committee on Graduate Work in Medicine, Dentistry and Pharmacy, 1853 W. Polk St., Chicago, Ill.

CARNEGIE FELLOWSHIPS FOR RESEARCH AND GRADUATE WORK IN THE DENTAL SCIENCES

AIDED by the Carnegie Corporation of the New York and the Eastman Dental Clinic, the School of Medicine and Dentistry of the University of Rochester offers scholarships paying $1,200-$1,800 per annum to well-trained dental graduates who are interested in research or who desire special training in the basic medical sciences as an aid to dental teaching or practice. A few fellowships also offer part-time training in oral surgery. On appointment, the applicant is given the title of Fellow in Dentistry and, according to his interest, works as a graduate student in one of the departments of the medical schools. Here, excellent laboratory facilities, adequate direction and close contact with various investigations related to medicine and dentistry help his research and study. Fellows are encouraged to attend medical classes, seminars and staff meetings and, when opportunity presents itself, to participate in class instruction and scientific meetings. Contact with the problems of clinical dentistry may be maintained through the Oral Surgery Clinic of the Strong Memorial Hospital and the Rochester Dental Dispensary. With the approval of the Graduate Council of the university, Fellows may prepare themselves for the degree of M.S., or Ph.D. Applications should be made to

GEORGE H. WHIPPLE, *Dean,*
Rochester, N. Y.

COLUMBIA UNIVERSITY COURSE FOR ORTHODONTISTS

THE School of Dental and Oral Surgery of Columbia University announces an intensive theoretical and practical course for orthodontists, under the direction of Joseph E. Johnson, assisted by Joseph D. Eby, Henry U. Barber, Jr., George B. Crozat, Clare K. Madden, Franklin A. Squires and Charles A. Spahn, December 6 to 12. The course will consist of lectures and technical training in the construction of bands, the lingual arch and the twin wire mechanism. A second course, under the direction of Robert H. W. Strang, assisted by Will H. Thompson, Jr., and Glenn H. Whitson, is announced for January 17-30, 1943.

Admission to the course is limited to members in good standing of the American Association of Orthodontists or of generally recognized sectional organizations of orthodontic specialists in America and foreign countries, or those who have passed the American Board of Orthodontics. For further information, address the Assistant to the Registrar, School of Dental and Oral Surgery, 630 West 168th St., New York, N. Y.

UNITED STATES PATENTS APPLICABLE OR PERTAINING TO DENTISTRY ISSUED DURING AUGUST, SEPTEMBER AND OCTOBER 1942

August 4

2,292,264, MEYER L. AXELROD. Hypnotic and analgesic compound.

August 11

2,292,568, MARCUS E. KANTER and SIDNEY A. FORMAN. Analgesia device.

2,292,707, SAMUEL A. MANTELL. Toothbrush.

August 18

2,293,446, MILTON M. ROZSA. Facial surveyor.

August 25

2,293,908, PYUNGTOO WILLIAM LEE and CHARLES DIETZ. All ceramic denture base with teeth, process and materials for producing same.

2,293,909, PYUNGTOO WILLIAM LEE and CHARLES DIETZ. Method of forming all ceramic denture.

2,294,087, CARL W. JOHNSON. Sterilizer.

2,294,285, CHAO-HSING CHU. Fountain toothbrush.

D-133,542, JOHN D. KELLS. Design for a fountain toothbrush.

September 1

2,294,631, JOHN ROCCA. Toothbrush.

2,294,747, EDGAR A. W. HABECK and EDWARD T. BESSLER. Toothbrush.

D-133,610, DENIS BORGEAT. Design for a rotary toothbrush.

September 8

2,294,900, LESLIE L. FULLER. Gum massage appliance.

2,295,201, NATHANIEL CHAYES. Removable denture.

September 15

2,295,806, RALPH G. PETERSON. Anesthesia and surgery restraining device.

2,295,849, GUSTAVE L. KAYDEN. Attachment for hypodermic syringes.

2,295,864, CHARLES H. PRANGE. Artificial tooth.

September 22

2,296,496, AARON W. BORTIN. Oxygen administering apparatus.

September 29

2,296,877, FRED A. SLACK, JR. Dental impression material and method for forming same.

2,297,519, ALBERT WERKENTHIN. Artificial tooth.

October 6

2,297,799, GEORGE W. PIFER. Viewing device.

2,297,826, ROSCOE J. BYRUM. Toothbrush and powder holder.

October 13

2,298,835, STANLEY E. NOYES. Dental impression composition.

October 20

2,299,114, CECIL SPENCER SIVIL and EDWARD O. LIEBIG. Alloy.

2,299,151, RALPH KESTLER. Dental drill.

2,299,251, ALBERT C. PERBAL. Adjustable bracket.

2,299,265, EDWARD L. CHOTT. Method and means for producing dental fillings.

2,299,285, JAMES C. TAYLOR, JR. Maxillary mandibular relator.

2,299,564, ALFONZO C. CASTILLO. Toothbrush.

October 27

2,300,070, ARTHUR E. SMITH. Ampule construction.

2,300,273, KARL CONNELL. Respirator.

2,300,305, SIMON MYERSON. Artificial tooth.

Christmas Seals

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We at home can help those who are fighting for the freedom of our children by lending the Government our money. Undoubtedly, you already own War Bonds—or are buying them now. But the Government has figured that to get the money it needs—you, and everybody, should put at least 10% of your income into War Bonds.

We urge that you unhesitatingly join in preserving the freedom that we all hold dear. Don't wait—don't delay—be a 10 percenter today!

Cook-Waite Laboratories, Inc. is proud to announce that a big proportion of its employees are 10 percenters.

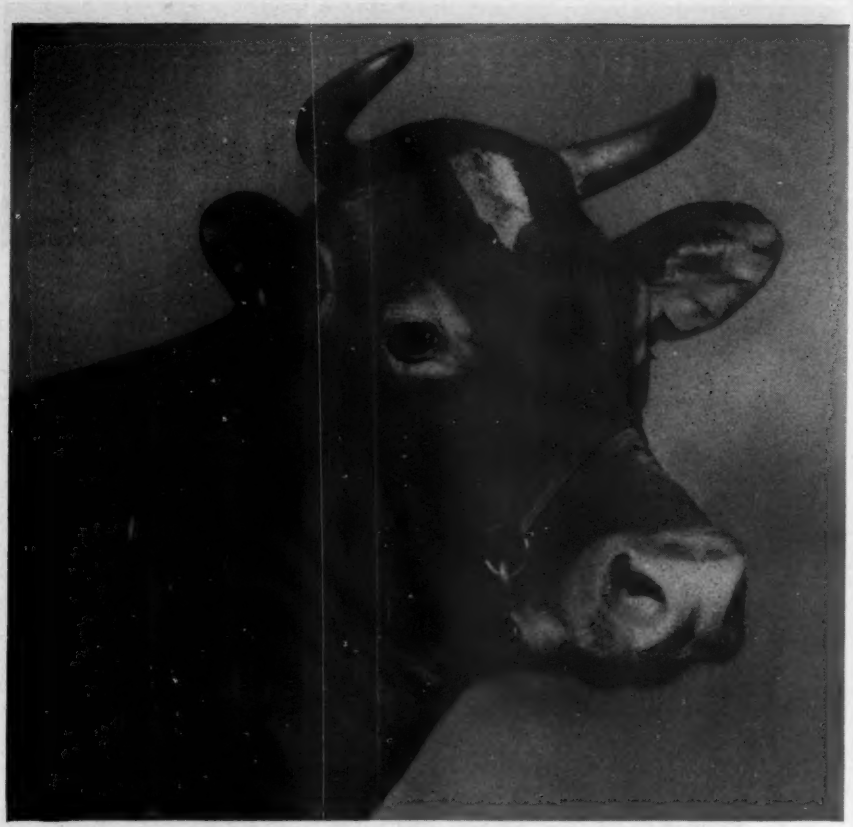
COOK-WAITE LABORATORIES, INC.

Manufacturers of NOVOCAIN with COBEFRIN

(Reg. Trademarks)

★★★★★★★★★★★★★★★

Buy War Bonds and Stamps



"I've just heard from my draft board"

"They tell me I'm in the Army now. I've passed my physical exam and all the rest of it, and I'm certified to do one of the most important jobs in the world—helping to give strength to America's fighting troops. . . ."

The lady has a right to be proud. For today, all over the United States, fresh milk is being served in Army camps as a basic part of the conditioning diet.

The rich and regular appearance of milk and milk products on U. S. Army mess tables is one of the reasons why the boys in the camps grow healthier month by month.

National Dairy is using its far-flung facilities for production, processing and distribution to speed milk and milk products in great volume to Army posts in many areas in this country.

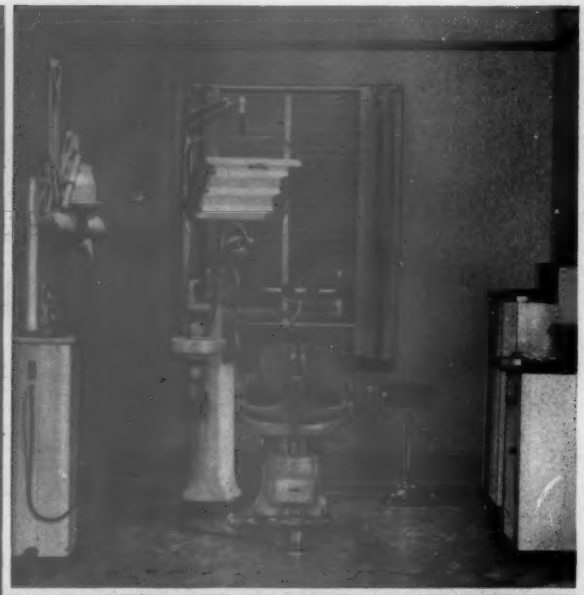
And to the men in service overseas, National Dairy is shipping millions of pounds of an unusual new milk product . . . a preserved butter for export that *will not melt at 110 degrees!*

This versatile food is only one of many products of National Dairy Products Corporation, an organization whose research is devoted to the exciting task of making milk and its many products ever more abundantly available to people everywhere.

Dedicated to the wider use and better understanding of milk as a human food . . . as a base for the development of new products and materials . . . as a source of health and enduring progress on the farm and in the towns and cities of America.

NATIONAL DAIRY
PRODUCTS CORPORATION
AND AFFILIATED COMPANIES

Originators of the Saalfeld System of Laboratory Protection



38,000 Dentists *need another operating room!*

...be prepared to treat still *more* patients!

From a Ritter survey there are 38,000 dentists—*not subject to military service*—who need additional operating room facilities.

Soon there will be only one dentist for every 2,377 civilians in the United States as compared with one for every 1,820 in 1929—which graphically shows how greater burdens are being placed on the shoulders of the profession.

Naturally, you are among the many dentists who desire to increase operating facilities—to take care of the ever-increasing number of patients—but equipment deliveries are delayed—for so much equipment is being manufactured for the armed forces. However, the time is coming when deliveries will be made . . . and you can assure yourself of equipment before the end of the emergency by seeing your Ritter dealer today.

● **Send today for your copies of two interesting Ritter brochures—"The First Impression Counts" and "Add 20% to Your Income." They tell you definitely what another operating room can do for you.**

Ritter

BUILT UP TO A STANDARD NOT DOWN TO A PRICE

Super Oralium

the high quality, low-priced, universal casting gold

Nine years ago, Baker Oralium, the original high palladium content, light weight, low cost casting gold was introduced. Its success was immediate and its use has since spread literally all over the world.

But, Oralium requires care if heat-treated and this outweighs its advantages in the minds of some. Now, we announce Super Oralium which while not requiring such careful handling, has all the advantages of the original —low specific gravity, although much higher in gold content; remarkable tarnish resistance and the fact that it can be used for all kinds of castings. Its price is a little higher — $1.30 a pennyweight. Neutral color.

BAKER

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Create Individualized Dentures

with

VERI-CHROME FIVE PHASE ANTERIORS

With these teeth, you can create for your patients dentures that faithfully reproduce the colorings, carvings, surface variations and other characteristics of human teeth. In Veri-Chrome Five Phase Anteriors the color, the varied labial surfaces and the three dimensional effects of natural teeth are simulated perfectly.

SPECIFY WITH THE VERI-CHROME COLOR GUIDE

½ ACTUAL SIZE

UNIVERSAL DENTAL COMPANY

Manufacturers of the Most Complete Line of Porcelain Teeth

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Mail this coupon for your copy of "The Fallacy of Tooth and Face Harmony"—an interesting research on tooth classification.

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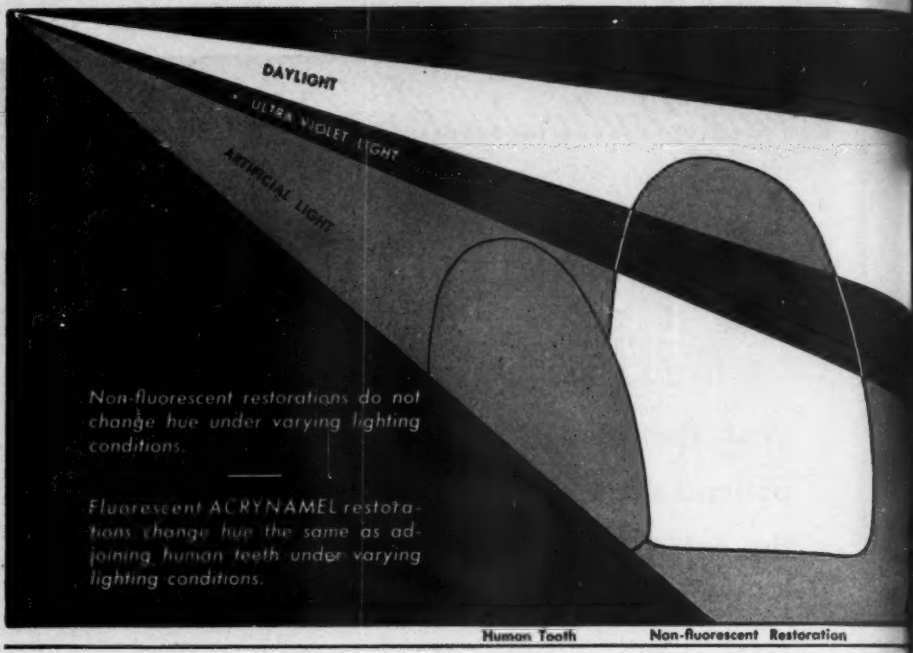
DAYLIGHT
ULTRA VIOLET LIGHT
ARTIFICIAL LIGHT
Non-fluorescent restorations do not change hue under varying lighting conditions.
Fluorescent ACRYNAMEL restorations change hue the same as adjoining human teeth under varying lighting conditions.
Human Tooth
Non-fluorescent Restoration

DENTA PEARL *Plastic Teeth*

COMFORTABLE • LIGHT • DURABLE • CLATTERPROOF

. . . replace the sensations of pressure and abrasion (customary with porcelain teeth) with the comfortable feeling of gliding lightness and ease. The unusual resilience of DENTA PEARL teeth not only makes these teeth more comfortable, but decreases impact shock and abrasion—helps preserve opposing natural teeth, peridental membrane, alveolar process.

DENTA PEARL plastic teeth not only restore perfectly—they preserve!

• • •

Other *Justi Products for Modern Prosthetics*

IMPRESSIONAC—a highly plasticized impression material for immediate insertion cases, full and partial dentures, removable bridges, and temporary relines. ImpressionAc is accurate.

Acrynamel STAINS—for artistic characterization of jackets and Denta Pearl teeth.

Acrynamel INVESTMENT—has adequate compressive strength for all acrylic work.

Acrynamel SEPARATOR—provides a smooth coating for investments.

Acrynamel DIE-MAC—an unusually hard die-stone for inlay and jacket crown dies and all master models.

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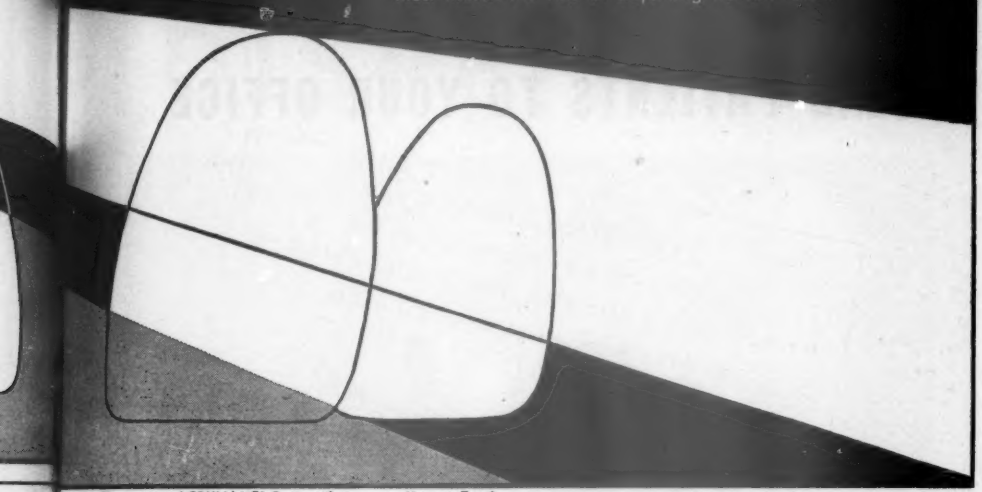
A 20-page illustrated catalog, "Justi Products for Modern Prosthetics," containing useful information on plastics, techniques and products, is now available to the Profession; ask your dealer or write directly to H. D. Justi & Son, Inc., 32nd and Spring Garden Sts., Philadelphia, Pa.

JUSTI *Products for.*

H. D. JUSTI & SON, INC., PHILADELPHIA, PA.

For perfect color harmony, the hue of the restoration must match the hue of adjoining human teeth.



Fluorescent ACRYNAMEL Restoration Human Tooth

FLUORESCENT

Acrynamel

Insist on Fluorescent ACRYNAMEL; what other Acrylic outfit offers these Features?

1. Natural fluorescence in each pre-blended shade.
2. Simplicity of dry-pack technique.
3. Non-granular appearance.
4. Fine particle size.
5. Even and complete dispersion of pigment.
6. The toughest, strongest, most beautiful acrylic material obtainable.
7. A Separator that really works.
8. Especially prepared methyl-methacrylate polymer.
9. Pure methyl-methacrylate monomer, supplied by Rohm & Haas.
10. An active Research Staff to help you with all problems.
11. Technical and educational progress in "Justi-Facts," published monthly in "Dental Survey" and "Dental Laboratory Review."
12. A natural fluorescent shade guide, which harmonizes with all other shade guides on the market, and matches natural teeth without formulae.

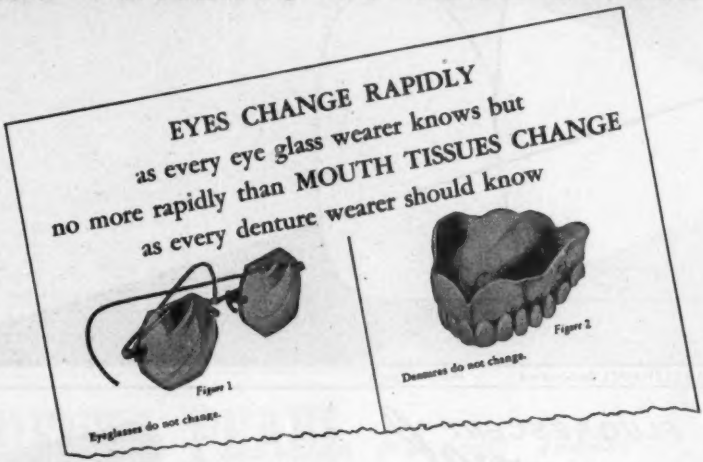
The MASTER KIT. $30.00 **The JUNIOR KIT. $18.50** (illustrated) **The LABORATORY KIT. $58.00**

... Modern Prosthetics

RELIABLE DENTAL PRODUCTS SINCE 1864

THE SIMPLE FACTS ABOUT ALVEOLAR RESORPTION

SEND PATIENTS TO YOUR OFFICE


EYES CHANGE RAPIDLY
as every eye glass wearer knows but
no more rapidly than MOUTH TISSUES CHANGE
as every denture wearer should know
Figure 1
Eyeglasses do not change.
Figure 2
Dentures do not change.

● **A few educational illustrations about alveolar resorption, such as the eye glass analogy reproduced above, can mean a big plus to your practice.**

Denture Closeups includes the eye glass analogy and other descriptive material to aid in showing patients why a return to their dentists is necessary, for rebasing.

This brochure stresses "Mouth Tissues Change, See Your Dentist." Copies are now available for use at the chair. Fasteeth's national advertising stresses the Mouth Tissues Change story. This institutional copy is designed to help you.

Write for Your Copy of "Denture Closeups" today!

CLARK-CLEVELAND, INC., BINGHAMTON, N.Y.

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Alkaline DENTURE POWDER

Buy Relief Fund Seals

Neat, Practical

DISPENSERS

For Pledgets...Cotton...Pellets

● Limited quantities of Dispensers still available. Handy at the chair and economical in use. Dispensers have weighted chromium plated base, transparent hycoloid body, chromium plated lid. Cotton sterilized after packaging.

ABSORBENT PLEDGETS. Extra Small. Dispenser and 4 Refills, Complete, $2.50. Additional Refills, 6 for $1.80.

DENTOFORM ABSORBENT COTTON. Dispenser and 1 Refill, $1.35. Additional Refills, 12 for $1.25.

COTTON PELLETS. Dispenser and 6 Refills, $2.50. Additional Refills, 12 for $1.75. Pellet Sizes (not assorted): Extra Small, No. 4; Small, No. 3.

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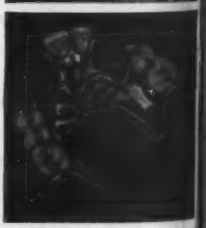
*CERTIFIED INLAY GOLDS IN TWO PRICE RANGES

S. S. White Casting Golds 940, 820, No. 13, and No. 3 are top-grade alloys for use when the highest possible quality is desired.

No. 2, No. 5, No. 8, No. 19 are thoroughly reliable precious metal alloys which may be used with confidence when your judgment dictates gold and the patient's income suggests economy.

Ask your laboratory to use S. S. White Golds in all your cases



Send us your gold scrap through your dealer

We allow market scrap value for the precious metal content of your gold scrap. Returns may be taken in cash, as a credit on account, or in the form of merchandise.

Prices subject to change without notice

THE S. S. WHITE DENTAL MFG. CO.

211 S. 12th Street, Philadelphia, Pa.

*These golds comply with A. D. A. Specification No. 5 for Inlay Golds.

†Extra hard—No specification has been set by the A. D. A. for this type of gold.

Golds

Reliable Alternates

WHEN ECONOMY IS A STRONG FACTOR

940* ***Soft - Type A***

A very soft, burnishable gold for occlusal and gingival inlays subject to slight or moderate stress.

Pure gold color. ***$2.20 per dwt.***

820* ***Medium Hard - Type B***

This is a definitely superior gold for M. O. D. and simple inlays, ¾ crowns, pontics and posterior abutments. It's hard, at the same time it is burnishable, a desirable combination of properties.

Light coin gold color.
$2.07 per dwt.

No. 13* ***Hard - Type C***

For M. O. D. inlays, full and ¾ crowns with thin sections, pontics, and inlay abutments, subject to hard stress.

Dark coin gold color.
$2.05 per dwt.

No. 3† ***Extra Hard***

An outstanding, tough, strong, springy gold for all types of clasps, bars, and partial dentures. No. 3 is also indicated for ¾ crowns with thin walls, M. O. D. inlays, cast cusps, fixed partial denture abutments when a gold of maximum strength and hardness is desired to withstand severe stress.

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No. 2*

Color 22K dark
$2.10 per dwt.

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Light gold color
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Light coin gold color
$2.00 per dwt.

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Light gold color
$1.70 per dwt.

SMOKING.

NICOTINE

and the stress of daily living

A bid for closer patient cooperation in adjustments of smoking hygiene

THE pace of modern life leaves its mark on many individuals. Symptoms, though remote, subclinical, may be of interest to the physician, perhaps in connection with nicotine intake.* Obviously, the exploration of this potential requires the patient's close cooperation.

In this situation there is an advantage to you in advising slow-burning Camel cigarettes. Millions have changed to Camels for their superior mildness and flavor—the famous Camel "pleasure factor."

Patient's compliance with your suggestions should lead to improved accuracy in case histories. This may present new clinical opportunities, especially when such records are grouped and studied as a whole.

**J.A.M.A., 93:1110—October 12, 1929*
Brückner, H.—Die Biochemie des Tabaks, 1936
The Military Surgeon, Vol. 89, No. 1, p. 5, July, 1941

"THE CIGARETTE, THE SOLDIER, AND THE PHYSICIAN," The Military Surgeon, July, 1941. Reprint available. Write Camel Cigarettes, Medical Relations Division, 1 Pershing Square, New York City.

Camel

COSTLIER TOBACCOS

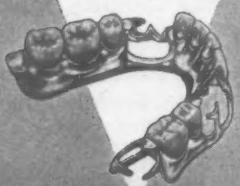
WHEN BETTER IS AVAILABLE..
DEMAND IT!

An indication of the finer qualities of Ticonium may be inferred from its wide acceptance by dental schools. Ticonium is the single non-precious metal that is widely used by schools in their instruction and practical work.

"YOU GET MORE WITH TICONIUM"

Only TICONIUM *possesses these extra advantages*

1. **DENSER CASTINGS**--Electrically melted, Ticonium maintains its original physical properties.
2. **STEEL DIE ACCURACY**--The great accuracy of Ticonium restorations saves time in fitting and adjusting.
3. **CAST OR WROUGHT CLASPS**--Ticonium may be fabricated with either cast or wrought wire clasps of the same basic alloy.
4. **EASY TO SOLDER**--Repairs and additions can be made with a high grade gold solder and Ticonium flux.



TICONIUM

413 North Pearl Street, Albany, N. Y.

CONSULT YOUR NEAREST TICONIUM LABORATORY

. . . without loss of protection

Conservation and thrift, so important today, have always been intrinsic advantages of Kolynos* Dental Cream. Kolynos is concentrated. It is best used only ½" on a dry brush. By proper use it lasts twice as long. Kolynos has a dual cleansing action:

1st—The cleansing, refreshing foam helps remove mucous plaques and food debris;

2nd—The action of carefully precipitated chalk polishes efficiently without harmful abrasion of the enamel.

Kolynos has a pleasant taste acceptable to the most discriminating type of patient.

KOLYNOS
DENTAL CREAM

Recommend Kolynos when your patients ask you about a good dentifrice.

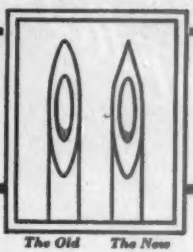
ACCEPTED AMERICAN DENTAL ASSOCIATION

*Reg. U. S. Pat. Off.

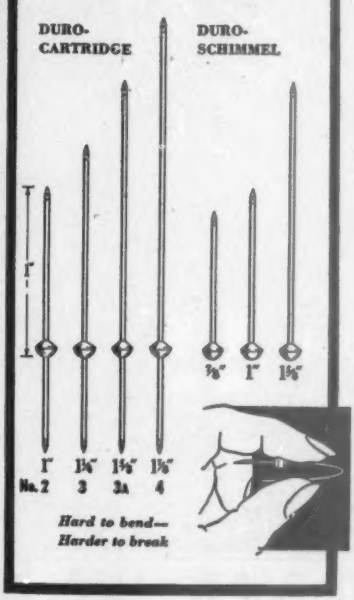
THE KOLYNOS COMPANY · NEW HAVEN, CONN.

PREPARE FOR TOMORROW

and Save



The Old *The New*



DURO *Rustless Steel* NEEDLES

With the Super-Sharp 'ShockLess' Point

In these days of war-induced shortages of materials and supplies, it's more important than ever to be prepared for all exigencies of daily practice. Which will suggest the desirability of protecting your needle requirements by requisitioning needed sizes *now*. And remember that when you specify DURO Needles you can effect a worth-while saving by ordering a 6-vial assortment of the lengths and gauges you use—not to mention the enhanced operating satisfaction you will derive from the improved 'ShockLess' Point, now standard on all 25 and 23 gauge R & R dental needles . . . Order an assortment today.

Per dozen—25 or 23 gauge:

DURO-SCHIMMEL		DURO-CARTRIDGE	
⅛ -inch	$1.00	No. 2 —1 -inch*	$1.25
1 -inch	1.10	No. 3 —1¼-inch	1.60
1½-inch	1.40	No. 3A—1½-inch*	1.75
		No. 4 —1⅝-inch	1.75

**Also available in 27 GAUGE at same price*

In lots of 6 dozen, 10 cents less per dozen

STAINLESS • STRONGER • SHARPER
SAFER

• THE RANSOM & RANDOLPH CO., TOLEDO, OHIO •

FOR CAST PARTIALS AND REMOVABLE BRIDGEWORK

JELENKO NO. 7
CAST GOLD
REG. U.S. PAT. OFF.

THE PATRICIAN OF CASTING GOLDS

UNSURPASSED among Gold Color Clasp, Bar and Saddle Golds in Quality and High Physical Properties.

GOLD COLOR
per Dwt. $2.00

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THE POPULAR-PRICED CASTING GOLD

THE DEPENDABLE

Popular-Priced Gold which for 11 Years Has Been Preferred where Economy Is Indicated.

GOLD COLOR
per Dwt. $1.70

Cast by . .

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THERMOTROL
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Other Patents Pending

. . . and be sure

AT YOUR DEALER

J. F. JELENKO & CO., INC.

Manufacturers of Dental Golds & Specialties

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COMPARE...

1. SPEED
2. DETAIL
3. CONTRAST

...and you'll specify Eastman Ultra-Speed Periapical Dental X-ray Film

This new double-emulsion film is so very fast . . . and it assures such fine detail and brilliant contrast . . . that a thorough trial is a "must" for everyone who prefers so-called "speed" film. Fraction-second exposures* at the usual anode-film distance minimize the time required for periapical radiographic examination, the chance of movement during exposure, and wear on the x-ray unit. The film is ideal for the long-anode-film-distance (20-in.) technic.

"Open-Easy" 1- and 2-film standard-size packets have blue-white, moisture-proof paper wrapping . . . lead-foil backing . . . smoothly rounded corners, and curved edges.

Ask the dental salesman who calls on you regularly for further details and prices—his service warrants your orders . . . Eastman Kodak Co., *Medical Division*, Rochester, N. Y.

*Required exposure only ⅛ that for Eastman *Regular* Periapical (and other single-emulsion films of like sensitivity); only ¼ that for Eastman *Radia-Tized* Periapical (and other double-emulsion films of like sensitivity) and Eastman *Rapid-Processing* Periapical.

Eastman X-RAY Materials
. . . THE COMPLETE LINE

Included **are Eastman *Rapid-Processing* Periapical Dental X-ray Film (R-P) and Eastman Radia-Tized Periapical Dental X-ray Film . . . both double-emulsion ("intermediate"); Eastman Regular Periapical Dental X-ray Film . . . single-emulsion ("slow").**

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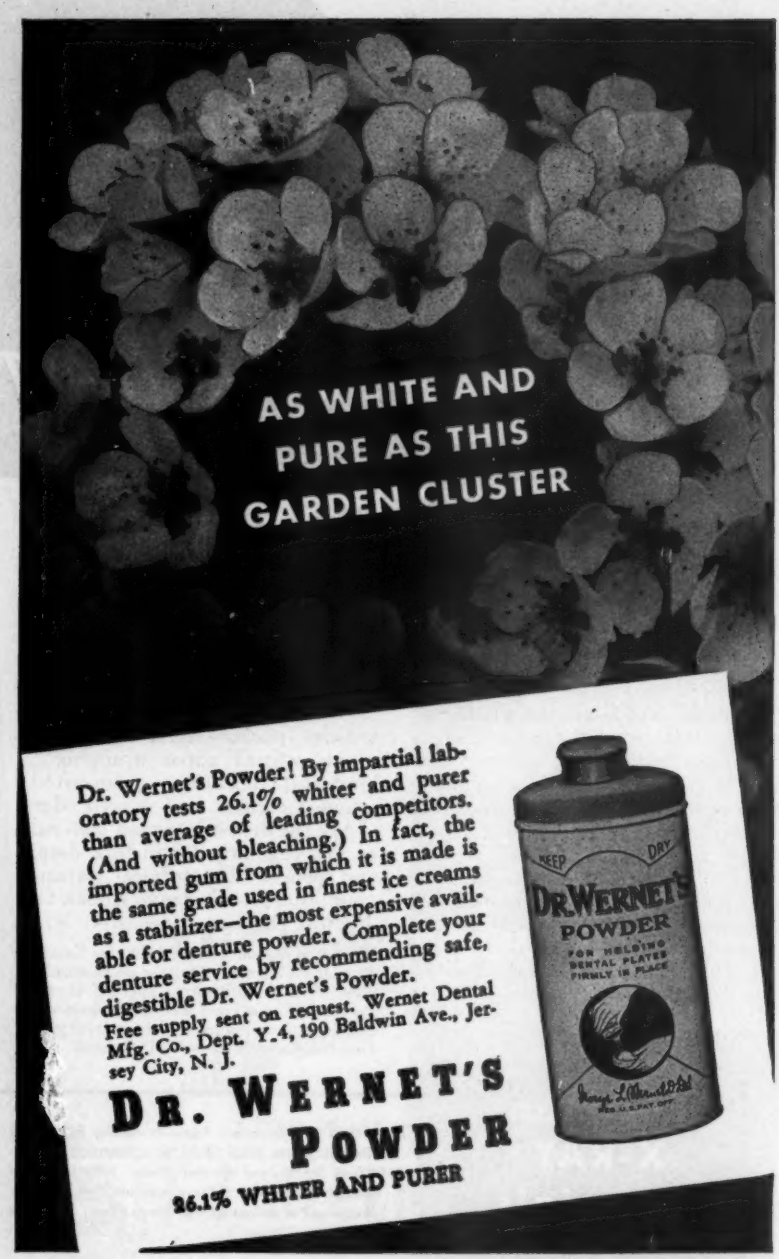
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PURE AS THIS
GARDEN CLUSTER
Dr. Wernet's Powder! By impartial laboratory tests 26.1% whiter and purer than average of leading competitors. (And without bleaching.) In fact, the imported gum from which it is made is the same grade used in finest ice creams as a stabilizer—the most expensive available for denture powder. Complete your denture service by recommending safe, digestible Dr. Wernet's Powder.
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DRY
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POWDER
FOR HOLDING
DENTAL PLATES
FIRMLY IN PLACE
DR. WERNET'S POWDER
26.1% WHITER AND PURER

CONSERVATION OF MANPOWER THROUGH BETTER DENTISTRY

THE U. S. Commission for the Conservation of Manpower has the unprecedented problem of putting *ten million* more men and women *to work* in the war industries within the next year.

Obviously, the dental condition of American men and women bears a close relationship to this tremendous task.

Productive hours lost on war projects due to dental ills are incalculable.

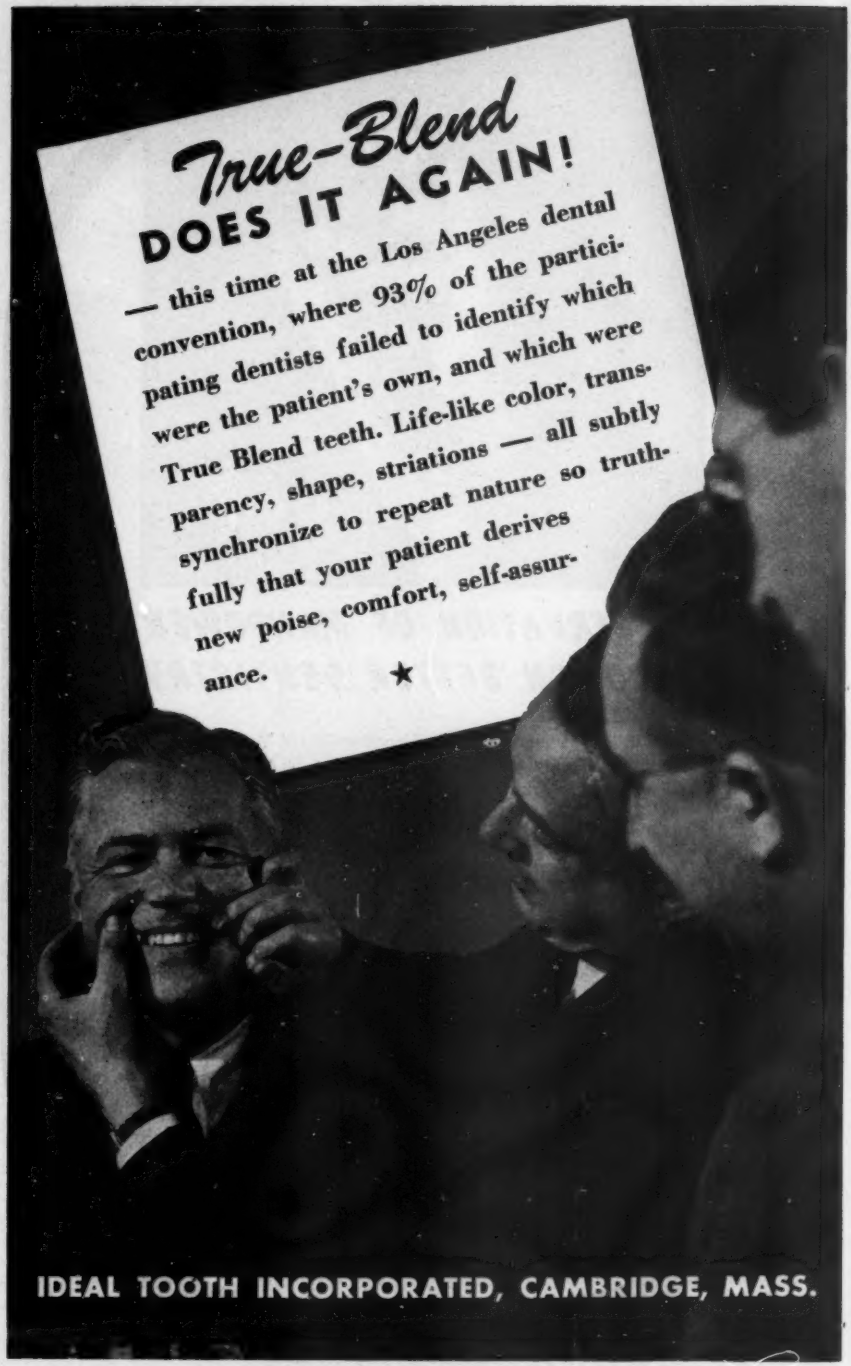
It is timely, therefore to point out to patients that *oral health is vital to victory;* that better materials constitute Better Dentistry; and that Better Dentistry contributes to multiplying the productive hours of the war workers of the nation.

May we suggest that you prescribe Vitallium as an aid to the Oral Health requisite to total industrial effort for Victory.

AUSTENAL LABORATORIES, INC.
NEW YORK • CHICAGO

Conserve Chair Time — Send your cases to a
VITALLIUM LABORATORY

★ TRADE MARK REG. U. S. PAT. OFF.


True-Blend
DOES IT AGAIN!
— this time at the Los Angeles dental convention, where 93% of the participating dentists failed to identify which were the patient's own, and which were True Blend teeth. Life-like color, transparency, shape, striations — all subtly synchronize to repeat nature so truthfully that your patient derives new poise, comfort, self-assurance.
★
IDEAL TOOTH INCORPORATED, CAMBRIDGE, MASS.

In Any Technic

WHATEVER casting technic you may use, there are three vitally important reasons why you should standardize on Kerr Cristobalite as your investment:—

1—Precision! Cristobalite is the only investment whose factor of shrinkage exactly equals that of your casting gold.

2—Conservation! Containing no chlorides, Cristobalite has no destructive effect on your casting rings, or on the delicate nichrome elements of your furnace.

3—Safety! Washes away from casting with brush only. No digging dangerous to delicate margins is ever necessary.

Get precision inlays all the time, and greatly prolong the life of critical-material casting equipment which you may not be able to replace until victory, by using only Kerr Cristobalite investment.

KERR DENTAL MFG. CO.
Detroit, Michigan
Established 1891

KERR *Cristobalite Investment*
REG. U.S. PAT. OFF.

ACCEPTED
AMERICAN
DENTAL
ASSOCIATION
WE PROUDLY SERVE
OUR COUNTRY
It is with pride that the Proco-Sol Chemical Company supplies the dentists of the armed forces of the United States with Procaine Solutions. Proco-Sol scientifically-controlled local anesthetics have met all necessary requirements.
Join the VICTORY FORCES WHO ARE USING
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Place a trial order today . . . . order a box or a vacuum tin of cartridges . . . be sure to specify "Proco-Sol" Procaine with Neo-Synephrin Hydrochloride, or with Epinephrin.
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Manufacturers of Fine Local Anesthetics

Ready this Month!

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By **HENRY M. GOLDMAN, D.M.D.,** Instructor in Oral Pathology, Harvard School of Dental Medicine, Harvard University. 400 pages, 310 illustrations, including 18 color plates.
PRICE, about $6.00

That important phase of dentistry, maintenance of the health of the periodontium, is brought to the fore by this newly published text. "PERIODONTIA" is a study of the histology, physiology, and pathology of the periodontium and the TREATMENT OF ITS DISEASES.

Before taking up therapy, Dr. Goldman provides a sound background of methods for examination, description and classification of periodontal diseases for diagnosis, principles of etiology, and histology, physiology and pathology.

The last section of the book gives a thorough, carefully correlated picture of the accepted methods of treatment. Dr. Goldman leaves nothing to the imagination in guiding you to the proper selection and application of treatment. Every measure which is likely to be an integral part of therapy in the cases which confront you is minutely described, and in many cases, illustrated with step-by-step photographs.

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Every alert dental practitioner realizes the importance of competent first aid and emergency treatment of jaw injuries. Dr. Thoma's timely text brings you practical, modern, authoritative guidance on this problem.
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(1) 1938, Nutrition Abstracts and Reviews 8, 281
(2) 1939, Food and Life: Yearbook of Agriculture U. S. Dept. Agriculture, U. S. Gov't Printing Office, Washington, D. C.

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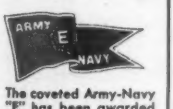

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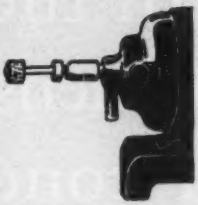

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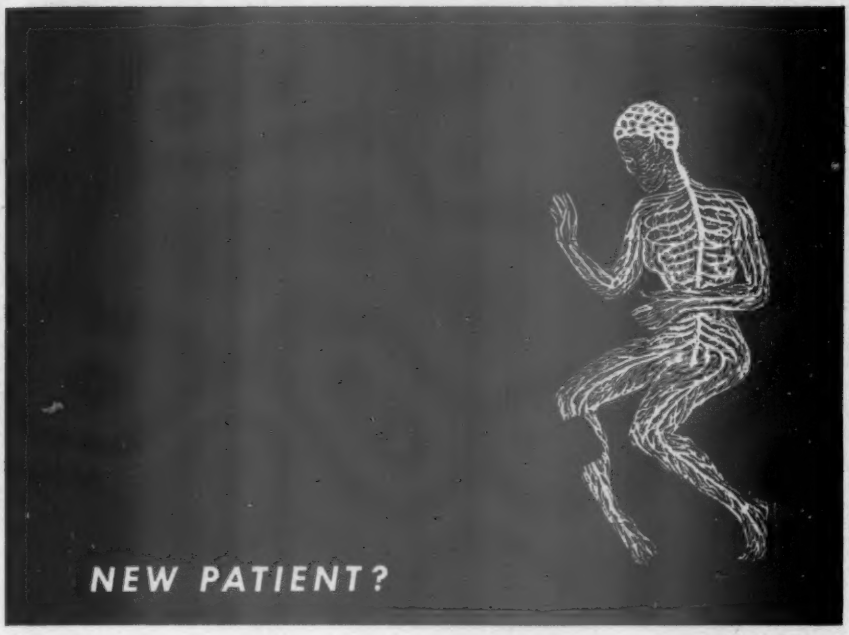

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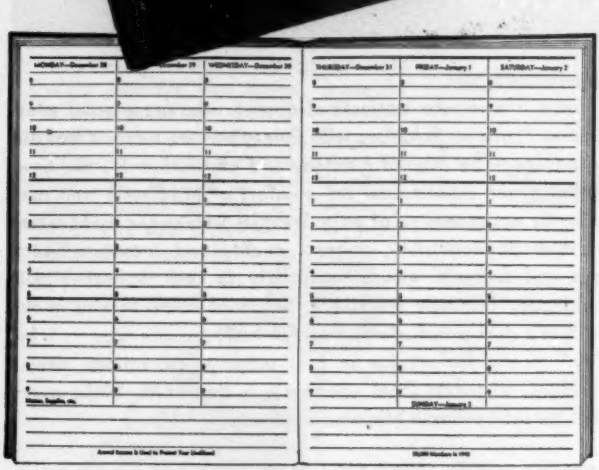

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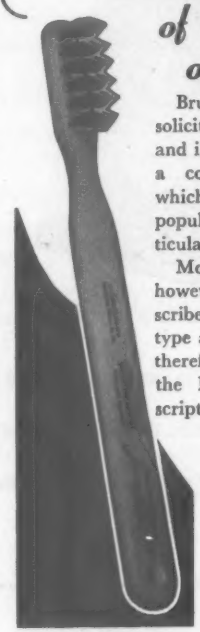

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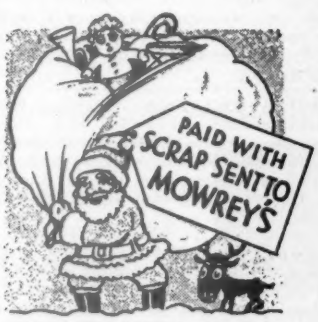

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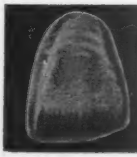

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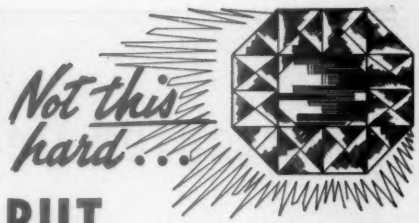

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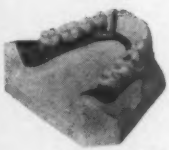

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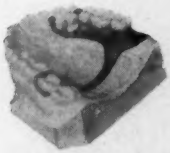

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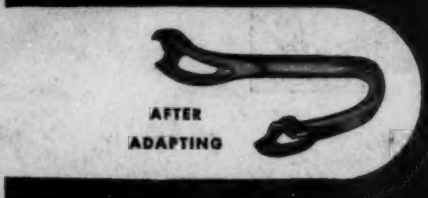

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